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THE TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY.

VOL. XX.

SESSION 1894-95.

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1895.

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PREFACE.

THIS, the twentieth volume of the Society's Transactions, contains a record of its proceedings during the Session 1894–95.

In it, as in former volumes, the views brought forward in the papers are to be considered as those of the writers themselves, and not as those of the Society as a body.

October 1895.

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	John M'Call, L.R.C.P. Ed.,	1886
	Thomas Wood, M.B., C.M.,	1886
	F. E. Drumheller, M.D., *Sunbury, Pennsylvania,*	1887
	F. W. D'Evelyn, M.B., C.M., *San Francisco,*	1887

		Date of Admission.
170	Alexander Forbes, M.B., C.M., *Liberton*,	1887
	Hugh M'Callum, L.R.C.P. & S. Ed., *Pitlochry*,	1887
	Nutting Stuart Fraser, M.B., M.R.C.S. Eng., *St John's, Newfoundland*,	1887
	George Franklin Shiels, M.D., F.R.C.S. Ed., *San Francisco*,	1887
	Alexander MacLachlan, M.B., C.M., *Beauly*,	1887
175	Augustus Alexander Matheson, M.D., F.R.C.P. Ed.,	1887
	Robert Mackenzie, M.D., C.M.,	1887
	Simon Linton, M.B., C.M., *Grangemouth*,	1887
	Henry Spelman Baumgartner, M.B., M.R.C.S. Eng., *Newcastle-on-Tyne*,	1887
	Thomas Jackson Thyne, M.B., F.R.C.P. Ed.,	1887
180	W. Burns Macdonald, M.B., C.M., *Dunbar*,	1887
	Charles William J. Chepmell, M.D., L.R.C.P. & S. Ed., *Brighton*,	1887
	John St Clair Boyd, M.D., M.Ch., *Belfast*,	1887
	Briton Smallman Robson, M.B., C.M., *Newcastle-on-Tyne*,	1887
	Ernest T. Roberton, M.D., M.R.C.S. Eng., *New Zealand*,	1887
185	*Samuel Sloan, M.D., F.F.P. & S. Glasg., *Glasgow*,	1887
	James Wm. Fox, L.R.C.P. & S. Ed., *London*,	1887
	John Frederick Sturrock, M.B., C.M., *Broughty-Ferry*,	1887
	Alexander Primrose, M.B., M.R.C.S. Eng., *Toronto, Canada*,	1887
	Arthur Perigal, M.D., M.R.C.S. Eng., *New Barnet, Herts*,	1887
190	James Aitken Clark, M.B., C.M.,	1887
	Edward Carmichael, M.D., F.R.C.P. Ed.,	1887
	Percival Humble Watson, M.R.C.S. Eng., L.R.C.P. Ed., *Newcastle-on-Tyne*,	1887
	Charles Clark Teacher, M.B., C.M.,	1887
	Robert Inch, M.B., C.M., *Gorebridge*,	1887
195	Ellis Thomas Davies, M.D., M.R.C.S. Eng., *Liverpool*,	1887
	Henry Alexis Thomson, M.D., F.R.C.S. Ed.,	1887
	John Orr, M.B., C.M., *Manchester*,	1887
	George Owen Carr Mackness, M.D., C.M., *Broughty-Ferry*,	1887
	Francis Joseph Baildon, M.B., C.M., *Southport*,	1887
200	Surgeon-Lt. Ralph H. Maddox, M.B., M.R.C.S. Eng., I.M.S., *Bombay*,	1887
	James Williamson Martin, M.D., F.R.C.P. Ed.,	1887
	James Andrew Blair, M.B., C.M., D.Sc., *Straiton, Maybole*,	1887
	John Robert Henry Dubourg, L.R.C.P. & S. Ed., *Liverpool*,	1887
	*John Thomson, M.D., F.R.C.P. Ed.,	1887
205	Tennent Ronalds, L.R.C.P. & S. Ed., *Killochan Castle, Girvan*,	1887
	William M'Creadie, M.B., M.R.C.P. Ed.,	1887
	Robert Kirk, M.D., F.R.C.S. Ed., *Bathgate*,	1887
	William Fraser Wright, M.B., C.M., *Leith*,	1887
	Alexander Bruce, M.D., F.R.C.P. Ed.,	1887
210	Richard Joseph Trestan, L.R.C.P. & S. Ed., *Retford, Notts*,	1887
	Robert Henry Blaikie, M.D., F.R.C.S. Ed.,	1888
	James Hutcheson, M.D., F.R.C.S. Ed.,	1888
	Farquhar W. Matheson, M.B., C.M.,	1888
	A. A. Jervis Pereira, M.D., *Delagoa Bay*,	1888
215	Christopher Martin, M.B., F.R.C.S. Eng., *Birmingham*,	1888
	John George Havelock, M.D., C.M., *Montrose*,	1888
	John Pirie, M.B., C.M.,	1888
	John Gibson Graham, M.B., C.M., *Glasgow*,	1888
	William Augustus Gibson, L.R.C.P. & S. Ed., *London*,	1888
220	Robert Adams Brewis, M.D., C.M., *Waratah, Tasmania*,	1888
	John Allison, M.D., C.M., *Kettering, Northampton*,	1888
	Surgeon-Captain Charles H. Bedford, M.D., M.R.C.S. Eng., Bengal Army, *Bombay*,	1888
	Archibald Cowan Guthrie, M.B., C.M.,	1888
	John Cunninghame, M.B., C.M., *New Zealand*,	1888
225	Samuel Beatty, M.B., C.M., *Pitlochry*,	1888
	Professor James Chalmers Cameron, M.D., *Montreal*,	1888

		Date of Admission.
	Archibald Home Douglas, M.B., F.R.C.P. Ed., *Nice*,	1888
	Albert Edward Morison, M.B., F.R.C.S. Ed., M.R.C.S. Eng., *Hartlepool*,	1888
	George H. Temple, M.B., C.M., *Eccles, Manchester*,	1888
230	Norman L. Boxill, M.B., C.M., *Barbados*,	1888
	Khumar B. Narayan, L.R.C.P. & S. Ed., *Cooch Behar, India*,	1888
	John Hunter Helm, M.B., C.M., *Ratho*,	1888
	William Lundie, M.D., C.M.,	1888
	Joseph Thom Tennant, M.B, C.M., *Bathgate*,	1888
235	George Scott MacGregor, M.B., C.M., *Glasgow*,	1888
	William Sneddon, M.B., C.M., *Cupar-Fife*,	1888
	Thomas Watts Eden, M.B., C.M., *London*,	1888
	William Fordyce, M.D., C.M.,	1888
	Andrew Fleming Wood, M.B., L.R.C.S. Ed.,	1889
240	Charles E. Harvey, M.B., M.R.C.S. Eng., *Sav-la-Mar, Jamaica*,	1889
	Frederick E. Welby, L.R.C.P. & S. Ed., *St Helena*,	1889
	Alexander Lang Murray, L.R.C.P. & S. Ed.,	1889
	George Pirrie Boddie, M.B., C.M.,	1889
	James F. W. Ross, M.D., *Toronto, Canada*,	1889
245	J. Stuart Nairne, F.R.C.S. Ed., F.F.P. & S. Glasg., *Glasgow*,	1889
	John David Williams, M.D., C.M., *Cardiff*,	1889
	James Fox, M.B., M.R.C.S. Eng., *Croston, Preston*,	1889
	S. M'Murtry, M.D., *Louisville, Kentucky, U.S.A.*,	1889
	Hugh Jamieson, M.D., C.M.,	1889
250	Thomas Wm. Nassau Greene, L.R.C.P. Ed., L.R.C.S.I., *London*,	1889
	John Clarence Webster, M.D., F.R.C.P. Ed.,	1889
	William George Aitchison Robertson, M.D., F.R.C.P. Ed.,	1889
	John Edward Sang, L.R.C.P. & S. Ed., *London*,	1889
	William Basil Orr, M.D., C.M.,	1889
255	Frederick Mann, M.B., C.M., *Ashton-on-Lyne*,	1889
	Edward Farr Armour, M.B., C.M.,	1889
	William C. Little, M.D., *Victoria, Australia*,	1889
	George Wilkinson, M.B., C.M., *Liverpool*,	1889
	James Lamond Lackie, M.D., M.R.C.P. Ed.,	1889
260	James Wilson, M.B., C.M.,	1889
	Alexander John Keiller, L.R.C.P. & S. Ed., *North Berwick*,	1889
	Archibald Maclean, M.D., C.M., *Kilmarnock*,	1890
	Frederick William Lyle, M.D., C.M., *London*,	1890
	Thomas Dobson Poole, M.D., C.M., *St Anne's-on-the-Sea*,	1890
265	Walter Scott Gibson, M.B., C.M., *London*,	1890
	Charles Newberry Cobbett, M.D., C.M., *London*,	1890
	Alexander William Gordon Price, M.B., C.M.,	1890
	Hugh Shapter Robinson, M.R.C.S. Eng., L.R.C.P. Ed., *London*,	1890
	George Matheson Cullen, M.D., C.M.,	1890
270	Frederick Albert Lawton Lockhart, M.B., C.M., *Montreal, Canada*,	1890
	Edmund Frederick Tanney Price, M.B., C.M.,	1890
	George Lovell Gulland, M.D., F.R.C.P. Ed.,	1890
	Ernest Theophilus Roberts, M.B., C.M., *Keighley*,	1890
	Owen Foulkes Evans, M.D., C.M., *Liverpool*,	1890
275	James Duncan Farquharson, M.B., C.M., *Newcastle-on-Tyne*,	1890
	William Smith, L.R.C.P. & S. Ed.,	1890
	Harvey Littlejohn, M.B., F.R.C.S. Ed., *Sheffield*,	1890
	Carstairs Cumming Douglas, M.B., C.M., *Skelmorlie, Ayrshire*,	1890
	Robert Wise, M.D., C.M., *London*,	1890
280	William Russell, M.D., F.R.C.P. Ed.,	1890
	William Paterson, M.B., C.M., *Glasgow*,	1890
	Alexander Scott Duncan, M.B., C.M., *London*,	1890
	Prof. William Keiller, F.R.C.S. Ed., *Galveston, Texas, U.S.A.*,	1890
	A. P. Chown, M.D., *Kingston, Canada*,	1891
285	Michael Dewar, M.D., C.M.,	1891

		Date of Admission.
	Gains T. Smith, M.D., *Moncton, New Brunswick*,	1891
	John Hugh Alexander Laing, M.B., C.M.,	1891
	Robert Thin, M.B., F.R.C.P. Ed.,	1891
	Charles Edward Lester, L.R.C.P. & S. Ed., *Australia*,	1891
290	Thomas Lawson, M.B., C.M.,	1891
	Alexander H. Vassie, M.B., C.M., *Kirkcaldy*,	1891
	James Harvey, M.B., C.M.,	1891
	Alexander Henderson, M.B., C.M.,	1891
	James Smith, M.B., C.M.,	1891
295	C. Carty Salmon, L.R.C.P. & S. Ed., *Melbourne, Australia*,	1891
	George Balfour Marshall, M.D., C.M., *Glasgow*,	1891
	Edward Henry Alexander, M.B., M.R.C.S. Eng., *New Zealand*,	1891
	William Booth, F.R.C.S. Ed.,	1891
	Harry St Clair Gray, M.D., C.M., *Glasgow*,	1891
300	Richard T. Yoe, M.D., *Louisville, Kentucky, U.S.A.*,	1891
	Alexander Bruce Giles, M.D., C.M.,	1891
	James Y. Simpson Young, M.B., C.M.,	1891
	Alexander Charles Harkness, L.R.C.P. & S. Ed., *Market Drayton*,	1891
	Alexander Jacobus van Niekerk, M.B., C.M., *Johannesburg, South Africa*,	1891
305	Hamilton G. Langwill, M.B., M.R.C.P. Ed., *Leith*,	1891
	Herbert Ernest Lee, M.B., C.M., *Australia*,	1891
	Charles Martin, M.B., C.M., *Birmingham*,	1892
	William Murray Cairns, M.B., C.M., *Formosa*,	1892
	Robert Dundas Helm, M.D., C.M., *Carlisle*,	1892
310	William Wood, M.B., C.M.,	1892
	James Thomas Moore Giffen, F.R.C.S. Ed., *Chester*,	1892
	John Alexander Robertson, M.B., C.M., *Whitsome, Chirnside*,	1892
	Frank Dendle, M.B., C.M., *Lochgelly*,	1892
	Julius Henry Beilby, M.B., C.M.,	1892
315	Frederick Thomas Anderson, M.D., L.R.C.P. & S. Ed.,	1892
	J. Gordon Smith, L.R.C.P. & S. Ed., *Jamaica*,	1892
	Simson Carstairs Fowler, M.B., C.M., *Juniper Green*,	1892
	Hugh Ernest Fraser, M.B., C.M., *Inverness*,	1892
	John Alexander Campbell Kynoch, M.B., M.R.C.P. Ed., *Dundee*,	1892
320	Alexander Brown Ritchie, M.B., C.M., *Hulme, Manchester*,	1892
	Walter John Shaw, M.B., C.M., *Innerleithen*,	1892
	Robert Stirling, M.D., C.M., *Perth*,	1892
	William Henry Vickery, F.R.C.S. Eng., L.R.C.P. Lond., *Newcastle-on-Tyne*,	1892
	George Foggin, L.R.C.P. & S. Ed., *Newcastle-on-Tyne*,	1892
325	William Ramsay Smith, M.B., C.M., *Rhyl*,	1892
	James Cecil Palmer, M.B., F.R.C.S. Ed., *New Zealand*,	1892
	A. Watson Munro, M.D., *Sydney, Australia*,	1892
	Charles Frederick Ponder, M.B., C.M., *Darjeeling, India*,	1892
	John Tod, M.B., C.M., *Leith*,	1892
330	Richard J. Erskine Young, M.D., C.M.,	1892
	George Thomas Cooke Adams, L.R.C.P. & S. Ed., *Melbourne, Australia*,	1892
	George Henry Walter Smith, M.D., C.M., *Sydney, Australia*,	1892
	John Lawson Dick, M.B., C.M.,	1892
	Charles Croomhall Easterbrook, M.B., C.M.,	1892
335	Walter Petrie Simpson, M.B., C.M., *Lincolnshire*,	1892
	James Ernest Moorhouse, M.D., C.M., *Stirling*,	1892
	Alfred James Anderson Peters, L.R.C.P. & S. Ed., *Arbroath*,	1892
	D. W. Johnston, F.R.C.S. Ed., *Johannesburg, South Africa*,	1892
	David George Davidson, M.B., C.M.,	1892
340	Robert M'Dowall Brown, M.B., C.M., *Denholm*,	1892
	Allen Thomson Sloan, M.D., C.M.,	1893
	Robert Balfour Graham, F.R.C.S. Ed., *Leven, Fife*,	1893
	Albert Frederick Rosa, M.B., C.M.,	1893

		Date of Admission.
	George Benjamin Mitchell, M.B., C.M., *Whitby*,	1893
345	Isaac Wood, M.D., *Kingston, Ontario, Canada*,	1893
	Andrew Walker, M.D., C.M., *Sheffield*,	1893
	H. Robins, M.D., *Jamaica*,	1893
	F. L. Burdon, M.D., *New Baltimore, Michigan*,	1893
	L. J. Schofield, M.D., *Warrensburg, Mo., U.S.A.*,	1893
350	David Milligan, M.B., C.M.,	1893
	John Howard-Jones, M.B., C.M., D.Sc., *Newport, Mon.*,	1893
	George Morton Wilcockson, L.R.C.P. & S. Ed., *Reading*,	1893
	Albert Franklin M'Vety, M.D., M.R.C.S. Eng., *Toledo, Ohio*,	1893
	John Macrae, M.D., C.M., *Murrayfield*,	1893
355	Ernest Switzer Forde, L.R.C.P. & S. Ed., *Derby*,	1893
	George Wade, M.D., C.M., *Melrose*,	1893
	Philip Grierson Borrowman, M.B., C.M., *Elie, Fife*,	1893
	Thomas Finlayson Macdonald, M.B., C.M.,	1893
	John Liddell, M.D., C.M., *Harrogate*,	1893
360	W. Herbert Gregory, M.B., *Beverley, Yorks*,	1893
	Ernest Coleman Moore, M.B., C.M.,	1893
	Cuthbert Christy, M.B., C.M., *East Molesey*,	1893
	Robert Hutchison, M.B., C.M.,	1893
	James Gibson Cattanach, M.B., C.M.,	1893
365	George Elder, M.B., M.R.C.P. Ed.,	1893
	Alexander Maitland Easterbrook, M.B., C.M., *Gorebridge*,	1893
	W. H. M'Kenley, M.D., *New York*,	1893
	Robert William Roberts, L.R.C.P. & S. Ed., *Newton, Mont.*,	1894
	Claude B. Ker, M.B., C.M.,	1894
370	John Malcolm Farquharson, M.B., C.M.,	1894
	Charles Alexander Butchart, M.B., C.M.,	1894
	Frederick Maurice Graham, L.R.C.P. & S. Ed.,	1894
	Robert Hoggan, M.B., C.M., *Crieff*,	1894
	James Livingstone Thompson, M.B., C.M.,	1894
375	George Stevenson Shirt Hirst, M.B., C.M., *Cambridge*,	1894
	John Stevens, M.D., F.R.C.P. Ed.,	1894
	Charles Isodon Bodon, M.D., *Berlin*,	1894
	Hugh Lewis Hughes, L.R.C.P. & S. Ed., *Dowlais*,	1894
	Sylvanus Glanville Morris, M.D., C.M., *Nantgaredig*,	1894
380	Georges P. Coromilas, M.D., *Calamata, Greece*,	1894
	Thomas Easton, M.D., C.M., *Stranraer*,	1894
	David Robertson Dobie, M.D., C.M., *Coldstream*,	1894
	Gopal Govind Vatve, M.D., *Bombay*,	1894
	Robert William Beesley, M.B., C.M.,	1894
385	William A. Stephen, M.B., C.M., *Loftus-in-Cleveland*,	1894
	William Edward Fothergill, M.B., C.M., *Manchester*,	1894
	George Sandison Brock, M.D., C.M., *Rome*,	1894
	Frederick William Mackay, M.D., C.M.,	1894
	John M. Munro Kerr, M.B., C.M., *Glasgow*,	1894
390	John Montgomery, M.B., C.M., *Birmingham*,	1895
	Robert Cochrane Buist, M.D., C.M., *Dundee*,	1895
	Robert Thomson Ferguson, M.B., C.M., *Anstruther*,	1895
	A. Kennedy Melville, M.D., C.M.,	1895
	William Henry Stephenson, L.R.C.P. & S. Ed., L.F.P. & S. Glasg., *Manchester*,	1895
395	Angus Vallance MacGregor, M.B., C.M., *Hartlepool*,	1895
	Charles William Donald, M.B., C.M.,	1895
	Oguntola Sapara, L.R.C.P. & S. Ed., *Lagos, W. Africa*,	1895
	John Struthers, M.B., C.M., *Transkei, South Africa*,	1895
	B. W. Broad, M.B., C.M., *Abergavenny*,	1895
400	Edwin Hindmarsh, M.B., C.M., *Bengal*,	1895
	Patrick Mackin, L.R.C.P. & S. Ed., *New Zealand*,	1895
	G. Edgar Helme, M.B., C.M., *Manchester*,	1895
403	Percy T. Hughes, M.B., C.M., *Darlington*,	1895

ORDINARY FELLOWS.

ARRANGED ALPHABETICALLY.

(*a.*) LIFE MEMBERS.

		Date of Admission.
	Barbour, Dr A. H. Freeland, 4 Charlotte Square,	1879
	Craig, Dr William, 71 Bruntsfield Place,	1870
	Hart, Dr D. Berry, 29 Charlotte Square,	1877
	Ponder, Dr Charles F., Guild Mission House, Kalimpong, Darjeeling, India,	1892
5	Ross, Dr James F. W., 481 Sherbourne Street, Toronto, Canada,	1889
	Simpson, Professor A. R., 52 Queen Street,	1858
	Struthers, Dr John, Nqamakwe, Transkei, South Africa,	1895
	Vatve, Dr Gopal Govind, care of H.H. The Rajah of Miraj, Bombay, India,	1894

(*b.*) ANNUAL SUBSCRIBERS.

	Adam, Dr George Rothwell, Carlton House, Hotham Street, East Melbourne, Australia,	1879
10	Adams, Dr George T. Cooke, 32 Collins Street, Melbourne, Victoria, Australia,	1892
	Affleck, Dr J. O., 38 Heriot Row,	1869
	Aikman, Dr Alfred, The Elms, Beverley Road, Hull,	1886
	Aitchison, Dr R. S., 74 Great King Street,	1886
	Alexander, Dr E. H., Albert Street, Dunedin, New Zealand,	1891
15	Alexander, Dr W. B., 8 Blenheim Place,	1882
	Allison, Dr J., Fuller House, Kettering, Northampton,	1888
	Anderson, Dr Fred. T., 20 Inverleith Row,	1892
	Andrew, Dr James, 2 Atholl Crescent,	1868
	Anglin, Dr W. G., 52 Earl Street, Kingston, Ontario,	1885
20	Archibald, Dr J., 2 The Avenue, Beckenham, Kent,	1877
	Armitage, Dr J. A., 28 Waterloo Road South, Wolverhampton,	1886
	Armour, Dr E. F., 149 Bruntsfield Place,	1889
	Badger, Dr W., Penicuik,	1880
	Baildon, Dr F. J., 57 Hoghton Street, Southport,	1887
25	Balfour, Dr Andrew, 12 Abercorn Terrace, Portobello,	1877
	Balfour, Dr G. W., 17 Walker Street,	1847
	Balfour, Dr J. Craig, West Street, Belford, Northumberland,	1884
	Ballantyne, Dr A., Dalkeith,	1870
	Ballantyne, Dr J. W., 24 Melville Street,	1883
30	Barrington, Dr Fourness, care of Commercial Banking Company of Sydney, 18 Birchin Lane, London, E.C.,	1884
	Baumgartner, Dr H. S., Saville Place, Newcastle-on-Tyne,	1887
	Beatty, Dr Samuel, Pitlochry,	1888
	Beatty, Dr W. J., Stockton-on-Tees,	1884
	Bedford, Surgeon-Captain Charles H., M.D., D.Sc., M.R.C.S. Eng., H.M. Indian Medical Service, care of W. Watson & Co., 28 Apollo Street, Bombay,	1888
35	Beesley, Dr R. W., Royal Maternity Hospital,	1894
	Beilby, Dr Julius H., 10 Clarendon Crescent,	1892
	Bell, Dr James L., Driffield, Yorkshire,	1884
	Bell, Dr Robert, 29 Lynedoch Street, Glasgow, W.,	1878
	Bentley, Dr G. H., Kirkliston,	1877
40	Black, Dr Alexander, 13 Howe Street,	1881
	Black, Dr J. Watt, 15 Clarges Street, Piccadilly, London, W.,	1863
	Blaikie, Dr R. H., 42 Minto Street,	1888
	Blair, Dr J. A., Straiton Manse, Maybole,	1887
	Bleloch, Dr A., 2 Lonsdale Terrace,	1876
45	Boddie, Dr G. P., 147 Bruntsfield Place,	1889
	Bodon, Dr C. I., Elsasser Strasse 92, Berlin, N.,	1894
	Booth, Dr William, 2 Minto Street,	1891

		Date of Admission.
	Borrowman, Dr Philip G., Elie, Fife,	1893
	Boxill, Dr N. L., Buttalls, St George, Barbados,	1888
50	Boyd, Dr J. St Clair, 27 Victoria Place, Belfast,	1887
	Brewis, Dr N. T., 23 Rutland Street,	1883
	Brewis, Dr R. A., Waratah, Tasmania,	1888
	Broad, Dr B. W., Bryncaen, nr. Abergavenny,	1895
	Brock, Dr G. Sandison, Hotel d'Italie, Rome,	1894
55	Brodie, Dr W. Haig, 88 Oxford Ter., Hyde Park, London, W.,	1881
	Brown, Dr R. M., Denholm, by Hawick,	1892
	Bruce, Dr Alexander, 13 Alva Street,	1887
	Buist, Dr J. W., 1 Clifton Terrace,	1877
	Buist, Dr R. C., Annfield House, Dundee,	1895
60	Burdon, Dr F. L., New Baltimore, Michigan, U.S.A.,	1893
	Butchart, Dr C. A., 26 Leith Walk,	1894
	Cairns, Dr W. Murray, E.P. Mission, Taiwanfoo, Formosa, Japan,	1892
	Calder, Dr H. L., 60 Leith Walk,	1882
	Cameron, Prof. James C., M.D., 941 Dorchester St., Montreal,	1888
65	Campbell, Dr Alexander, 1 Clarendon Terrace, Dundee,	1885
	Cappie, Dr James, 37 Lauriston Place,	1862
	Carmichael, Dr Edward, 21 Abercromby Place,	1887
	Carmichael, Dr James, 22 Northumberland Street,	1871
	Cattanach, Dr J. G., 3 Alvanley Terrace,	1893
70	Chepmell, Dr Charles, 74 Dyke Road, Brighton,	1887
	Chown, Dr A. P., 255 Brock Street, Kingston, Canada,	1891
	Christy, Dr Cuthbert, Redlynch, Manor Road, East Molesey, Surrey,	1893
	Church, Dr H. M., 36 George Square,	1875
	Clark, Dr J. A., 4 Cambridge Street,	1887
75	Cobbett, Dr C. N., 29 Rosslyn Hill, Hampstead, London, N.W.,	1890
	Collie, Dr Robert J., St George's Lodge, Catford, London, S.E.,	1883
	Connel, Dr J., Peebles,	1869
	Coromilas, Dr Georges P., Calamata, Greece,	1894
	Cox, Dr Joshua J., St Ronan's, Eccles, Manchester,	1876
80	Croom, Dr J. Halliday, 25 Charlotte Square,	1870
	Croudace, Dr J. H., 23 Marston Road, Stafford,	1878
	Cruickshank, Dr B., Nairn,	1885
	Cullen, Dr G. M., 48 Lauriston Place,	1890
	Cumming, Dr A. S., 18 Ainslie Place,	1885
85	Cunninghame, Dr John, Port Chalmers, New Zealand,	1888
	Currie, Dr A. S., 81 Queen's Road, Finsbury Park, London, N.,	1882
	Darling, Dr T. Brown, 13 Merchiston Place,	1884
	Davidson, Dr D. G., 18 Granville Terrace,	1892
	Davies, Dr E. T., 97 Shaw Street, Liverpool,	1887
90	Dendle, Dr Frank, Lochgelly, Fife,	1892
	D'Evelyn, Dr F. W., 219 Geary Street, San Francisco,	1887
	Deverell, Dr H. C., 12 Windsor Street,	1882
	Dewar, Dr M., 24 Lauriston Place,	1891
	Dick, Dr J. L., 61 Dalry Road,	1892
95	Dickson, Dr George, 9 India Street,	1867
	Dobie, Dr D. R., Coldstream,	1894
	Donald, Dr C. W., Konsgarth, Braid Road,	1895
	Douglas, Dr A. Home, Rue Blacas, Nice, France,	1888
	Douglas, Dr Carstairs, 3 Eglinton Place, Skelmorlie, Ayrshire,	1890
100	Drumheller, Dr F. E., 406 Market St., Sunbury, Pennsylvania,	1887
	Dubourg, Dr J. R. H., 120 Islington, Liverpool,	1887
	Duncan, Dr A. J., Nethergate House, Nethergate, Dundee,	1879
	Duncan, Dr A. S., Eversley, Penge, London, S.E.,	1890
	Dunlop, Dr H. M., 20 Abercromby Place,	1884
105	Dunsmure, Dr J., 53 Queen Street,	1876
	Easterbrook, Dr A. M., Deanbank, Gorebridge,	1893
	Easterbrook, Dr C. C., Morningside Asylum,	1892

		Date of Admission.
	Easton, Dr Thomas, Hanover House, Stranraer,	1894
	Eden, Dr T. Watts, 21 Bentick Street, Cavendish Square, London, W.,	1888
110	Elder, Dr George, 7 Leopold Place,	1893
	Elder, Dr W. Nicol, 6 Torphichen Street,	1879
	Evans, Dr O. F., 79 Mulgrave Street, Liverpool,	1890
	Farquharson, Dr J. D., 242 Westgate Road, Newcastle-on-Tyne,	1890
	Farquharson, Dr J. M., 14 Gilmore Place,	1894
115	Felkin, Dr R. W., 8 Alva Street,	1884
	Fenwick, Dr Kenneth N., 141 King Street West, Kingston, Canada,	1885
	Ferguson, Dr J. Haig, 25 Rutland Street,	1885
	Ferguson, Dr R. T., Anstruther, Fife,	1895
	Finlay, Dr W. A., St Helen's, Russell Place, Trinity,	1880
120	Foggin, Dr George, 63 Westmorland Road, Newcastle-on-Tyne,	1892
	Forbes, Dr A., Liberton,	1887
	Forde, Dr E. S., Dalry, Galloway,	1893
	Fordyce, Dr William, 18 Torphichen Street,	1888
	Fothergill, Dr W. E., 200 Oxford Street, Manchester,	1894
125	Foulis, Dr James, 34 Heriot Row,	1878
	Fowler, Dr Simson C., Juniper Green,	1892
	Fox, Dr James, Mount Pleasant, Croston, near Preston, Lancashire,	1889
	Fox, Dr J. W., 68 Lupus Street, Pimlico, London, S.W.,	1887
	Fraser, Dr F. W. Dyce, Gorton House, Lasswade,	1883
130	Fraser, Dr H. E., 63 Church Street, Inverness,	1892
	Fraser, Dr J. Joynor, Hessle, East Yorks,	1880
	Fraser, Dr Nutting S., 205 Grosvenor Street, St John's, Newfoundland,	1887
	Freeland, Dr Richard, Broxburn,	1879
	Gayton, Dr William, Bartram Lodge, Fleet Road, Hampstead, London, N.W.,	1885
135	Gemmell, Dr J. E., 12 Rodney Street, Liverpool,	1885
	Gibson, Dr W. A., 3 Overstrand Mansions, Battersea Park, London, S.W.,	1888
	Gibson, Dr W. Scott, 34 Dulwich Rd., Herne Hill, London, S.E.,	1890
	Giffen, Dr J. J. M., 129 Boughton, Chester,	1892
	Giles, Dr A. B., 1 Kew Terrace,	1891
140	Gilmour, Dr T. F., Port Ellen, Islay,	1882
	Glaister, Dr John, 4 Grafton Place, Grafton Square, Glasgow,	1879
	Gracie, Dr C. B., Buccleuch Villa, Burntisland,	1885
	Graham, Dr F. M., Medical Mission Dispensary, Cowgate,	1894
	Graham, Dr J. Gibson, 5 Ashgrove Ter., Partickhill, Glasgow,	1888
145	Graham, Dr R. Balfour, Leven, Fife,	1893
	Grasett, Dr F. L., 208 Simcoe Street, Toronto, Canada,	1877
	Gray, Dr H. St Clair, 15 Newton Terrace, Glasgow,	1891
	Greene, Dr J. W. N., Beaumont House, Church Road, Forest Hill, London, S.E.,	1889
	Gregory, Dr W. H., North Bar Street, Beverley, Yorks,	1893
150	Gulland, Dr G. L., 6 Alva Street,	1890
	Guthrie, Dr A. Cowan, Swanville, 134 Newhaven Road,	1888
	Hamilton, Dr J. R., Hawick,	1879
	Hamp, Dr J. Walton, Penn Road, Wolverhampton,	1886
	Hardcastle, Dr H. M., Archbold Lodge, Newcastle-on-Tyne,	1886
155	Hardie, Dr Thomas, 10 John's Place, Leith,	1870
	Harkness, Dr A. C., Willoughbridge, Market Drayton, Salop,	1891
	Harvey, Dr Charles G., Kingswood, Sav-la-Mar, Jamaica, W.I.,	1889
	Harvey, Dr James, 7 Blenheim Place,	1891
	Haultain, Dr F. W. N., 17 Rutland Street,	1884
160	Havelock, Dr J. G., Sunnyside, Montrose,	1888
	Hay, Dr Henry, 7 Brandon Street,	1879

		Date of Admission.
	Helm, Dr J. H., Ratho,	1888
	Helm, Dr R. Dundas, 3 Alfred Street N., Portland Sq., Carlisle,	1892
	Helme, Dr G. Edgar, Gloucester House, Rusholme, Manchester,	1895
165	Henderson, Dr Alexander, 17 Fettes Row,	1891
	Henderson, Dr John, 7 John's Place, Leith,	1857
	Hewetson, Dr J., Holmfield, Reigate,	1881
	Hindmarsh, Dr Edwin, Mozufferpore, Tirhoot State Railway, Bengal, India,	1895
	Hirst, Dr George S. S., Ranelagh, Willis Road, Cambridge,	1894
170	Hoggan, Dr R., 18 Burrell Street, Crieff,	1894
	Hooper, Dr J. W. D., Lying-in Hospital, Melbourne, Australia,	1884
	Howard-Jones, Dr J., Town Hall, Newport, Mon.,	1893
	Hughes, Dr H. L., Gwerullwyn House, Dowlais, Glamorganshire,	1894
	Hughes, Dr P. T., Holy Trinity Vicarage, Darlington,	1895
175	Hunter, Dr George, 33 Palmerston Place,	1881
	Hurst, Dr George, Scott Chambers, 96 Pitt St., Sydney, N.S.W.,	1881
	Husband, Dr William, 4 Royal Circus,	1857
	Hutcheson, Dr J., 44 Moray Place,	1888
	Hutchison, Dr Robert, 18 Albany Street,	1893
180	Hyslop, Dr J. M'A., 22 Palmerston Place,	1874
	Inch, Dr Robert, Gorebridge,	1887
	Jamieson, Dr Hugh, 13 Lauriston Place,	1889
	Jamieson, Dr James, 43 George Square,	1866
	Johnston, Dr D. W., P.O. Box 2022, Johannesburg, South African Republic,	1892
185	Johnston, Dr W., Stirling,	1871
	Keiller, Dr A. J., North Berwick,	1889
	Keiller, Prof. Wm., Medical College, Galveston, Texas, U.S.A.,	1890
	Ker, Dr C. B., 4 Howard Place,	1894
	Kerr, Dr J. M. Munro, 28 Berkeley Terrace, Glasgow,	1894
190	King, Dr J. K., The Glen Springs Sanitorium, Watkins, New York, U.S.,	1884
	Kirk, Dr Robert, Bathgate,	1887
	Kynoch, Dr Campbell, 30 Springfield, Dundee,	1892
	Lackie, Dr James, 21 Maitland Street,	1889
	Laing, Dr J. H. A., 11 Melville Street,	1891
195	Langwell, Dr H. G., 49 Charlotte Street, Leith,	1891
	Lawson, Dr Thomas, 16 Dean Terrace,	1891
	Lee, Dr Herbert E., Gunnedah, N.S.W., Australia,	1892
	Leigh, Dr J. Dickinson, The White House, Brotton, Yorkshire,	1886
	Lester, Dr Charles E., Mudgee, N.S.W., Australia,	1891
200	Liddell, Dr J., North View, Victoria Avenue, Harrogate,	1893
	Linton, Dr John, 60 George Square,	1863
	Linton, Dr Simon, Grangemouth,	1887
	Little, Dr W. C., Warracknabeal, Victoria, Australia,	1889
	Littlejohn, Dr Harvey, 13 Victoria Road, Sheffield,	1890
205	Lockhart, Dr F. A. L., 59 Metcalfe Street, Montreal, Canada,	1890
	Lucas, Dr Robert, Dalkeith,	1871
	Lundie, Dr William, 3 Glengyle Terrace,	1888
	Lyle, Dr F. W., 39 The Avenue, Castle Hill, Ealing, London, W.,	1890
	M'Call, Dr John, 4 Leopold Place,	1886
210	M'Callum, Dr H., Pitlochry,	1887
	M'Creadie, Dr William, 164 Ferry Road,	1887
	Macdonald, Dr T. F., 9 Palmerston Place,	1893
	Macdonald, Dr W. B., Port Lodge, Dunbar,	1887
	Macdonald, Dr W. Fraser, Auchtermuchty,	1884
215	MacGregor, Dr A. V., The Hospital, Hartlepool,	1895
	Macgregor, Dr G. S., 2 Burnbank Terrace, Glasgow,	1888
	Mackay, Dr F. W., 39 Morningside Drive,	1894
	Mackay, Dr George, 2A Gilmore Place,	1879
	Mackay, Dr G. Hugh, Elgin,	1884
220	M'Kenley, Dr W. H., 137 West 26th Street, New York,	1893

		Date of Admission.
	Mackenzie, Dr R., Napier Villa, Merchiston,	1887
	Mackin, Dr Patrick, Wellington, New Zealand,	1895
	MacLachlan, Dr A., Beauly,	1887
	M'Lean, Dr Archibald, Cronbouro, Kilmarnock,	1890
225	M'Murtry, Dr L. S., 231 West Chesnut Street, Louisville, Kentucky, U.S.A.,	1889
	M'Nab, Dr John, Obbe, Harris, Stornoway,	1873
	Mackness, Dr G. O. C., Fort Street House, Broughty-Ferry,	1887
	Macrae, Dr John, Lynwood, Murrayfield,	1893
	M'Vety, Dr A. Franklin, 235 12th Bath Street, Toledo, Ohio,	1893
230	Macvie, Dr S., Chirnside,	1881
	M'Watt, Dr John, Morelands, Duns,	1879
	Macwatt, Dr R. C., Indian Medical Service, 15th Bengal Cavalry, care of Messrs King, King, & Co., Bombay,	1885
	Maddox, Dr Ralph H., I.M.S., care of Messrs William Watson & Co., 28 Apollo Street, Bombay,	1887
	Mann, Dr F. W., 266 Katherine Street, Ashton-under-Lyne,	1889
235	Marshall, Dr G. Balfour, 11 Woodside Crescent, Glasgow,	1891
	Marshall, Dr William, Milnathort,	1884
	Martin, Dr Charles, Cleveland House, George Road, Edgbaston, Birmingham,	1892
	Martin, Dr Christopher, 35 George Rd., Edgbaston, Birmingham,	1888
	Martin, Dr J. W., 16 Nelson Street,	1887
240	Matheson, Dr A. A., 41 George Square,	1887
	Matheson, Dr F. W.,	1888
	Matthew, Dr Alexander, Corstorphine,	1885
	Melville, Dr A. Kennedy, 35 Mayfield Gardens,	1895
	Menzies, Dr David, 20 Rutland Square,	1877
245	Messer, Dr Fordyce, Helensburgh,	1866
	Michael, Dr Gustave, 188 Commercial Road East, London, E.,	1885
	Millard, Dr W. W., 3 George Place,	1884
	Miller, Dr W. H., 51 Northumberland Street,	1886
	Milligan, Dr D., 11 Palmerston Place,	1893
250	Mills, Dr James, Janesville, Wisconsin, U.S.A.,	1885
	Mitchell, Dr G. B., 40 Baxtergate, Whitby,	1893
	Moir, Dr Alex., 30 Buccleuch Place,	1876
	Montgomery, Dr John, Mary Street, Balsall Heath, Birmingham,	1895
	Moore, Dr E. Coleman, 2 Coates Place,	1893
255	Moorhouse, Dr J. Ernest, 1 Windsor Place, Stirling,	1892
	More, Dr James, Rothwell, Kettering, Northampton,	1880
	Morison, Dr Albert E., Brougham Terrace, Hartlepool,	1888
	Morris, Dr S. Glanville, The Surgery, Nantgaredig, South Wales,	1894
	Mowat, Dr John, 1 Hope Park Terrace,	1884
260	Munro, Dr A. Watson, 183 Liverpool Street, Sydney, Australia,	1892
	Murray, Dr A. Lang, 18 Duddingston Park, Portobello,	1889
	Murray, Dr D. R., 41 Albany Street, Leith,	1878
	Murray, Dr James, 1 Brandon Street,	1879
	Murray, Dr R. Milne, 11 Chester Street,	1880
265	Nairne, Dr J. Stuart, 197 Pitt Street, Glasgow,	1889
	Napier, Dr A. D. L., 67 Grosvenor Street, Grosvenor Square, London, W.,	1878
	Narayan, Mr Kumar B., Cooch Behar, India,	1888
	Nesham, Dr T. Cargill, 12 Ellison Place, Newcastle-on-Tyne,	1885
	Niekerk, Dr Alexander van, Box 68, Johannesburg, S. African Republic,	1891
270	Nisbet, Dr W. B., Townsville, N. Queensland, Australia,	1886
	Oakes, Dr Arthur, "Warialda," Portarlington Road, Bournemouth,	1879
	Oliphant, Dr E. H. Lawrence, 18 Burnbank Terrace, Glasgow,	1885
	Orr, Dr John,	1887
	Orr, Dr W. Basil, 13 Braid Road,	1889

		Date of Admission.
275	Pairman, Dr T. Wyld, H.M. Prison, Lyttelton, New Zealand,	1883
	Palmer, Dr J. C., Christ Church, Canterbury, New Zealand,	1892
	Paterson, Dr G. Keppie, 17 Forth Street,	1882
	Paterson, Dr William, Millbrae Road, Langside, Glasgow,	1890
	Peddie, Dr Alexander, 15 Rutland Street,	1840
280	Peddie, Dr H. Anderson, 24 Palmerston Place,	1882
	Pereira, Dr A. A. Jervis, Surgeon to the Delagoa Bay Railway, Lourenço Marques, Delagoa Bay, South Africa,	1888
	Perigal, Dr A., New Barnet, Herts,	1887
	Peters, Dr James A., 97 Keptie Street, Arbroath,	1892
	Pirie, Dr John, 10 Ardmillan Terrace,	1888
285	Playfair, Dr John, 5 Melville Crescent,	1873
	Poole, Dr T. D., Aberdeen Cottage, Poulton-le-Fylde,	1890
	Porteous, Dr J. Lindsay, 83 Warburton Avenue, Yonkers, New York,	1875
	Price, Dr A. W. Gordon, 9 Grange Road,	1890
	Price, Dr E. F. T., 1 Middleby Street,	1890
290	Primrose, Dr Alex., 196 Simcoe Street, Toronto, Canada,	1887
	Pringle, Dr J. Hogarth, 1 Holland Place, Glasgow,	1886
	Proudfoot, Dr Thomas, 13 Lauriston Place,	1884
	Puckle, Dr S. Hale, Bishop's Castle, Shropshire,	1885
	Ranking, Dr J. E., Tunbridge Wells,	1881
295	Rattray, Dr A. M. T., Portobello,	1869
	Reid, Dr W. L., 7 Royal Crescent, Glasgow, W.,	1880
	Reid, Dr W. Spence, Oakley, Kirkcudbright,	1880
	Rendell, Dr Herbert R., P.O. Box 606, St John's, Newfoundland,	1882
	Richardson, Dr William, 1 Belgrave Villas, Cothum Grove, Bristol,	1884
300	Ritchie, Dr A. Brown, 117 Boston Street, Hulme, Manchester,	1892
	Ritchie, Dr D. W. L., 22 East Claremont Street,	1883
	Ritchie, Dr James, 22 Charlotte Square,	1880
	Ritchie, Dr R. Peel, 1 Melville Crescent,	1861
	Roberton, Dr Ernest, Auckland, New Zealand,	1887
305	Roberts, Dr Ernest T., 85 Skipton Road, Keighley,	1890
	Roberts, Dr R. W., Bryn Hafren House, Newtown, Mont.,	1894
	Robertson, Dr J., 30 Lauriston Place,	1881
	Robertson, Dr John A., Whitsome Manse, Chirnside,	1892
	Robertson, Dr W. B., St Anne's, Thurlow Park Road, West Dulwich, London, S.E.,	1870
310	Robertson, Dr W. G. A., 26 Minto Street,	1889
	Robins, Dr H., Sav-la-Mar, Jamaica,	1893
	Robinson, Dr H. Shapter, Talfourd House, Talfourd Road, Camberwell, London, S.E.,	1890
	Robson, Dr B. S., 66 Brighton Grove, Newcastle-on-Tyne,	1887
	Ronalds, Dr Tennent, Killochan Castle, Girvan,	1887
315	Ronaldson, Dr T. R., 3 Bruntsfield Terrace,	1877
	Rosa, Dr Albert F., 20 Dundonald Street,	1893
	Rosa, Dr George, 12 Gayfield Square,	1867
	Rowland, Dr L. Lindsay, Salem, Oregon, U.S.A.,	1879
	Russell, Dr W., 46 Albany Street,	1890
320	Salmon, Dr C. Carty, "Newells," Toorak Road, South Yarra, Melbourne, Australia,	1891
	Sang, Dr J. E., Balgownie, Bedford Hill, Balham, London, S.W.,	1889
	Sapara, Dr Oguntola, Lagos, W. C. Africa,	1895
	Saunders, Dr F. A., Grahamstown, Cape Colony, South Africa,	1885
	Schofield, Dr L. J., Warrensburg, Mo., U.S.A.,	1893
325	Scott, Dr T. R., Musselburgh,	1880
	Shaw, Dr W. J., Innerleithen,	1892
	Shiels, Dr G. F., 229 Geary Street, San Francisco,	1887
	Simson, Dr W. Petrie, Tattershall, Lincoln,	1892
	Sloan, Dr Allen T., 22 Forth Street,	1893

		Date of Admission.
330	Sloan, Dr S., 5 Somerset Pl., Sauchiehall St. West, Glasgow,	1887
	Smart, Dr David, 74 Hartington Road, Sefton Park, Liverpool,	1882
	Smith, Dr D., Fullerton Cottage, Johnshaven, Montrose,	1870
	Smith, Dr G. H. Walton, Erang, Oxford St., Sydney, Australia,	1892
	Smith, Dr Gains T., Moncton, New Brunswick, Canada,	1891
335	Smith, Dr James, 1 Parsonsgreen Terrace,	1891
	Smith, Dr John, Brycehall, Kirkcaldy,	1885
	Smith, Dr J. Gordon, Melrose, Porus, Jamaica, W.I.,	1892
	Smith, Dr William, 14 Hartington Gardens,	1890
	Smith, Dr W. Ramsay, Plas Newydd, Rhyl,	1892
340	Sneddon, Dr William, Cupar-Fife,	1888
	Somerville, Dr Robert, Galashiels,	1881
	Spalding, Dr William, Gorebridge,	1867
	Spence, Dr R., Burntisland,	1878
	Spence, Dr William, Dollar,	1884
345	Stephen, Dr W. A., Loftus-in-Cleveland, Yorkshire,	1894
	Stephenson, Dr W. H., 137 Rochdale Road, Harpurhey, Manchester,	1895
	Stevens, Dr John, 3 Shandon Crescent,	1894
	Stewart, Dr J. S., 15 Merchiston Place,	1884
	Stewart, Dr R., 42 George Square,	1885
350	Stirling, Dr R., 4 Athole Place, Perth,	1892
	Stirling, Dr Stewart, 4 Coates Crescent,	1866
	Sturrock, Dr J. F., Arima, Broughty-Ferry,	1887
	Sym, Dr A. C., 144 Morningside Road,	1885
	Taylor, Dr William, 12 Melville Street,	1868
355	Teacher, Dr C., 16 Newington Road,	1887
	Temple, Dr G. H.,	1888
	Tennent, Dr J. T., Bathgate,	1888
	Thatcher, Dr C. H., 8 Melville Crescent,	1877
	Thin, Dr Robert, 38 Albany Street,	1891
360	Thom, Dr Alexander, Viewfield, Crieff,	1884
	Thompson, Dr James L., Australasian Club,	1894
	Thomson, Dr A. D. R., Musselburgh,	1877
	Thomson, Dr Alexis, 32 Rutland Square,	1887
	Thomson, Dr James, David Place, St Heliers, Jersey,	1881
365	Thomson, Dr John, 14 Coates Crescent,	1887
	Thomson, Dr J. Stitt, The Mount, Lincoln,	1877
	Thyne, Dr T. J., 2 Dean Terrace,	1887
	Tod, Dr John, 93 Ferry Road, Leith,	1892
	Tristan, Dr R. J., Retford, Notts,	1887
370	Underhill, Dr C. E., 8 Coates Crescent,	1872
	Underhill, Dr Frederick T., Mission City, British Columbia,	1885
	Underhill, Dr T. Edgar, Dunedin, Barnt Green, Worcestershire,	1879
	Vassie, Dr Alexander H., Wemyssfield, Kirkcaldy,	1891
	Vickery, Dr W. H., 52 Elswick Road, Newcastle-on-Tyne,	1892
375	Wade, Dr George, Melrose,	1893
	Walker, Dr Andrew, 406 Glossop Road, Sheffield,	1893
	Walker, Dr A. Wallace, 24 Forth Street,	1886
	Wallace, Dr Abraham, 64 Harley Street, London, W.,	1879
	Watson, Dr P. H., 72 Jesmond Road, Newcastle-on-Tyne,	1887
380	Watson, Dr W., 54 Mayfield Road,	1865
	Waugh, Dr John, 36 Finsbury Pavement, London, E.C.,	1881
	Webster, Dr A. D., Belleville Lodge, S. Blacket Place,	1881
	Webster, Dr J. C., 20 Charlotte Square,	1889
	Welby, Dr Frederick E., Colonial Surgeon, St Helena,	1889
385	Wilcockson, Dr G. Morton, 183 Southampton Street, Reading,	1893
	Wilkinson, Dr George, 109 Park Road, Liverpool,	1889
	Will, Dr Ogilvie, 379 Union Street, Aberdeen,	1867
	Williams, Dr J. D., 20 Windsor Place, Cardiff,	1889
	Wilson, Dr James, 53 Inverleith Row,	1889
390	Wilson, Dr T. D., 10 Newington Road,	1879

		Date of Admission.
	Wise, Dr Robert, 5 Weston Park, Crouch End, London, N.,	1890
	Wood, Dr A. Fleming, City Fever Hospital,	1889
	Wood, Dr Isaac, Kingston, Ontario,	1893
	Wood, Dr Russell, 9 Darnaway Street,	1880
395	Wood, Dr Thomas, 55 Ferry Road,	1886
	Wood, Dr William, 19 Roxburgh Street,	1892
	Wright, Dr W. F., Bonnington Mount, Bonnington Terrace,	1887
	Wylie, Dr Hamilton, 1 George Place,	1879
	Yoe, Dr Richard T., 2103 Floyd Street, Louisville, Kentucky, U.S.A.,	1891
400	Young, Dr J. Y. Simpson, 14 Ainslie Place,	1891
	Young, Dr Peter, 43 Heriot Row,	1859
	Young, Dr Peter A., 25 Manor Place,	1871
403	Young, Dr R. J. Erskine, 14 Ainslie Place,	1892

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TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY,

FOR SESSION LVI., 1894–95.

MEETING I.—NOVEMBER 14, 1894.

Dr A. H. FREELAND BARBOUR, *President, in the Chair.*

I. The following gentlemen were elected Ordinary Fellows of the Society:—Thomas Easton, M.A., M.D., Hanover House, Stranraer; D. Robertson Dobie, M.D., 13 High Street, Coldstream.

II. *Dr J. A. C. Kynoch* exhibited FŒTUS WITH UMBILICAL CORD COILED SIX TIMES ROUND THE NECK. The mother was a primipara, æt. 28, who supposed herself full time, but date of last menstruation was uncertain. Fœtal movements ceased three weeks before the onset of labour, and there was no history of excessive movements at any time. On examination there were no fœtal heart-sounds to be heard; a good deal of abdominal tenderness, especially over the left side; pains excessively strong. Vertex presentation; membranes ruptured. Fœtus and placenta were expelled together, and beyond slight post-partum hæmorrhage, due to traction on the placenta by the relatively short cord, there was nothing unusual to be noted. Duration of labour, fifteen hours. The cord, 34 inches long, is firmly coiled six times round the neck. The specimen is of interest on account of this unusual coiling, in the absence of the usual predisposing factors, viz., small child, great length of cord, and excess of liquor amnii.

III. SOME ASPECTS OF HEREDITY.

By A. H. FREELAND BARBOUR, M.D., F.R.C.P. Ed.

AN introductory address is a break in the regular proceedings of our Society. It is an invitation to strike off the hard and somewhat dusty road along which our science must tramp if it is to

advance, and take a by-path into the woods. This may mean wasted time; or it may lead to a point from which we get a wider view, and see familiar landmarks in new relations: at all events, it is a pleasant change.

Of recent years the discussion on the nature and physical basis of life has given place to one on the nature and physical basis of heredity. The two discussions are closely related, because one of the characteristics of life is the power of reproduction—which means not merely to produce living matter, but to *re*-produce itself; and reproduction implies heredity.

The question of heredity has invaded every department of literature. You meet it in Zola's *Dr Pascal*,[1] in Ibsen's *Ghosts*, in Kidd's *Social Evolution*. Every question is being looked at afresh from this standpoint: heredity and crime, heredity and alcoholism, heredity and every form of disease.

My object in bringing the subject of heredity before you this evening is not to attempt to give a full statement of the various views that have been advanced, which would be impossible in the time at my disposal; nor to criticise any of them, or go into their merits, which is beyond my powers; but only to glance at some aspects of the question in a suggestive rather than an exhaustive way, to show that it is a question in which we are all bound to take an interest, because it is much further-reaching than appears at first sight.

By way of introduction to the subject, let me mention the chief contributions to our knowledge of it.

The first scientific theory of heredity was given thirty years ago in Herbert Spencer's *Polarity of Physiological Units* (1864). This was followed four years later by Darwin's *Pangenesis of Gemmules* (1868). Two years after this, Hering threw out his conception of *Memory in Organic Matter* (1870); and two years later still, came Galton's *Stirp* (1872), in which we first find the idea of the "continuity of the hereditary material." In another four years came Haeckel's *Perigenesis of the Plastidules* (1876), and Jäger's *Aroma* (1876), with a more definite statement of the "continuity of the germ plasm." Seven years after this, Brooks gave another modification of pangenesis, ascribing different functions to the "male and female cells," and explaining variation by "sexual union" (1883). The same year saw Weismann's first article on *Heredity* (1883), which was followed two years later by his *Continuity of the Germ Plasm*, and ten years later (last year) by his *Germ Plasm*.[2]

[1] "The novel will be a sermon on heredity, and will establish my theory that the day when men know how to master this influence of heredity they will be, what they are not now, the masters of the destiny of the human race."—Author's preface to *Dr Pascal*.

[2] The literature is given very fully in J. A. Thomson's admirable paper on the "History and Theory of Heredity" (*Proceedings of the Royal Society of Edin.*, 1888-89), to which and to Romanes' *Examination of Weismannism* I gladly acknowledge my indebtedness.

Darwin's, Galton's, Brooks', and Weismann's theories we shall consider more fully later on. One word here as to the others.

Herbert Spencer borrows his analogy from crystallization; the units composing the living substance possess polarity, just as the units which build up crystals. In virtue of this property, living matter assumes the forms with which we are familiar, the unit of life being a physiological one—something between the chemical unit (which, of course, enters into protoplasm) and the morphological unit of the cell.

Hering's idea is that the transmission of qualities from cell to cell is a transmission of vibrations of material particles,—in a word, of "memory." We find "conscious memory" in the nerve cells of the brain, "unconscious memory" in habit, "inherited memory" in instinct and in the reproduction of the parent in the child: all is equally "memory in living matter"—continuous from the earliest existence of protoplasm to the present hour. The individual dies; the universal memory of living matter persists. It is but a step from Hering's continuous memory to Wordsworth's "not in entire forgetfulness."

Haeckel's "plastidules" are something smaller than the "plastid" or morphological cell, and may be taken as equivalent to Spencer's physiological units. Life is a wave-motion of these. A single life is a single wave; the development of life on the earth, a wave-motion compounded of these and tending always to branch. This rhythmical motion of the plastidules he calls "perigenesis." The undulations are affected by external causes; and once produced, the modification persists like a rhythm. It is handed on from one generation to another in "memory." Haeckel thus takes up Hering's idea; in both these theories "memory" is synonymous with "reproduction," which is the characteristic of living matter.

Jäger's *Duft-und-Wurzestoff*, which I have translated "aroma," is a stuff which is liberated from the cells and tissues, diffuses through the body, and is concentrated in the reproductive cell. It is a pangenesis of aroma instead of gemmules. Difficulties with regard to the origin and transmission of gemmules are literally lost *sight* of in an aroma.

Weismann's theory, as elaborated in his last book on *Germ-plasm*, should also be referred to here. In the *Germ-plasm* he introduces us to an organised army of living atoms—the biophors. These are practically the same as physiological units and plastidules; the new idea is their organisation. They are marshalled under determinants, these again under ids, the ids under idants, the idants under idio-plasm. The organisation of the biophors might well have been suggested by the army of his fatherland; the discipline is as perfect; the manœuvring as orderly, though quite bewildering to one not versed in the peculiar tactics. And the well-known solidarity of the German army finds its counter-

part in the stability of the germ-plasm, with which its persistence or continuity is intimately associated.

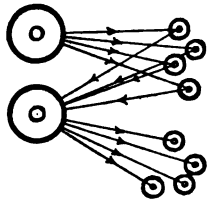
Looking at these theories collectively, one is struck with the fact that one and the same thing, heredity, has been described in terms of chemistry, physics, psychology, and biology. This can be accounted for in one of two ways: either that we have not yet found the true mode of describing it; or that it is such a complex, or, if I may so say, many-sided process, that no one mode of description is adequate to the facts—it will not come wholly within any nomenclature. Chemistry gives us the most suggestive phraseology; but the language of chemistry, if used literally (*i.e.*, not symbolically), can only convey the facts of chemistry,—that is, express the chemical part of the problem.

Another fact that strikes us is the unity of biological science,—that it is possible to express one and the same thing by so many different symbols. What to Spencer is "crystallization," to Hering is "unconscious memory;" to Haeckel, "rhythmic motion;" to Weismann, "stable organisation."

A caution also suggests itself with regard to our mode of thinking out the subject. While it is necessary to *talk* in pictures — and the symbolic mode of representing the facts of heredity is very suggestive—we must not *think* in pictures, or, if we do so, must remember the fallacies that lie thick in incomplete analogies. One could easily collect from the various speculations in heredity, which are full of this pictorial reasoning, examples of fallacies which have stolen in under cover of a suggestive illustration.

Let us consider now more fully the four other views not yet described, and the questions which they raise. We shall take Darwin's and Weismann's as representing two diametrically opposite views, and Galton's and Brooks' as occupying an intermediate position.

Darwin's theory of heredity might be represented graphically thus:



The reproductive cell gives origin to a colony of somatic cells, forming the body or soma of the individual.

From this colony, again, is produced a reproductive cell, each member of the colony sending his contribution.

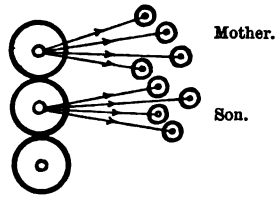
This reproductive cell in turn produces a new colony of somatic cells, and these in turn a reproductive one.

We can label these groups of cells "mother" and "son." To simplify the diagram, I have omitted the paternal contribution.

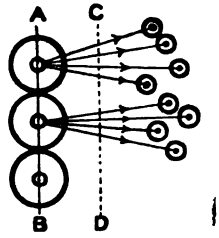
I need not give further details of this mechanism of heredity—*e.g.*, the gemmules given off from the somatic cells, which travel in the direction indicated, or the much-vexed question as to how

the gemmules could travel, or, rather, reach their destination. Darwin's theory, of which this diagram gives the salient points, expressed in scientific terms the received view that the son was made up of his father and mother, that he inherited all their characteristics, congenital and acquired. Though he inherited all of them he need not necessarily *show* all of them, as they might become latent in him; just as he might show others which were not seen in his parents, being passed on by them in a latent condition from a former ancestor. Still, the mechanism admits of everything's being passed on, and especially all the characters acquired during life by the different parts of the body. Further, the reproductive material is each time compounded afresh, of ingredients taken from every part of the whole man.

Contrast now with this, *Weismann's* view, which I shall endeavour also to represent graphically. The reproductive cell produces the cells of the body or soma as before. But, further, *it* produces the reproductive cell of the next generation. That one produces its somatic cells, and also the reproductive cells of another generation, and so on. Hence we have a continuous succession of



reproductive cells, or, to be more accurate, of germ-plasm in the nucleus of the reproductive cell. This continuity I might indicate by a line AB drawn through the nuclei. The continuity of germ-plasm is the first feature in this theory, a feature which it has in common with Galton and Brooks.



Then, again, there are no lines passing from the body to the reproductive cell. This implies that germ-plasm has been not only continuous, but absolutely continuous, because no new element has come into it at any point. There is a line AB, and it is a continuous one.

This shutting of the door to all outside influences (and by outside I mean not only the environment but also the action of the cells of the soma) means that the cause of variation must be sought within, and can only be produced by a mixing of germ-plasm in sexual union. This mixing allows of all combinations and recombinations of elements—say A, B, C, to Z—nothing more. When asked how these elements came to have their nature fixed, A to be A and not B, Weismann takes you back to the protozoa, or to a still earlier period, when environment, which has ceased to act on reproductive cells buried in colonies, acted on them as separate individuals. Since that time A has remained A all through; and although there have occurred the most complex combinations of A with all the other elements, yet A has preserved through all of them its pristine nature. This persist-

ence of A as A means absolute stability on the part of the elements of germ-plasm. The ideas of unbroken continuity and absolute stability of germ-plasm lay at the foundation of Weismann's theory of heredity as he originally stated it. In his last book he has modified his position as to the absoluteness of these, but they still remain as the characteristic feature of his view. The line AB is continuous; must be so, because no other line has broken in on its continuity; and what has travelled along it has a wonderful degree of stability.

Further, the absence of lines running from the soma to the reproductive cell, means that there is no mechanism by which any modification of the body can be transmitted to the reproductive cell; characteristics acquired during the life of the individual cannot be transmitted.

Now, note what these assumptions lead up to. You might draw a dotted line, CD, and make two provinces—one containing reproductive cells, and another somatic cells. It makes two types of cell. The reproductive cell is a stranger, asks indeed for board and lodging in the colony of somatic cells, but beyond that has no intercourse with the cells of that generation. It lives apart. We shall refer to this isolation of the reproductive cell again, but draw attention to it here as a logical part of Weismann's theory.

I took Weismann's theory as being at the opposite pole from Darwin's, and we are now in a position to see how this is so. Darwin provided a mechanism for the complete transmission of all acquired characteristics, brought the reproductive cell into direct relation with all the other cells of the body, and far from giving the reproductive cell a different nature made it a compound of all the cells of the body. Hence the son is, in a very literal sense, a reproduction of the parent.

Weismann abolishes all mechanism for the transmission of acquired characteristics, isolates the reproductive cell, and gives it by implication a different nature. There is no reproduction of the parent. If the son is like the father, it is because they both happen to resemble a third party.

Galton and Brooks take up intermediate positions. Galton makes the continuity of the germ-plasm, or as he calls it "stirp," prominent but not absolute. A margin is left for the occasional transmission of acquired characteristics. I might express his view diagrammatically by introducing here and there return lines from the soma to the reproductive cells.

He has not definitely committed himself as to the transmission of acquired characteristics. In his *Natural Inheritance* he says, "It is therefore extremely difficult to see how acquired faculties can be inherited by the children; it would be less difficult to conceive of their inheritance by the grandchildren."

Galton's "stirp" consists of the germs collected in the fertilized ovum: he does not analyse the stirp into units or plastidules.

His object is to study inductively where it has come from; and he says that a man's stirp is composed $\frac{1}{4}$ from each parent ($\frac{1}{2}$ from the two combined), another $\frac{1}{4}$ from his four grandparents, and the remaining $\frac{1}{4}$ from the more remote ancestors.

Another fact which he has brought out is the stability of the "mean" qualities of any people, and the tendency of divergent members to gravitate in their posterity towards the mean. The importance of this, from an educational and social point of view, we shall see immediately.

Brooks, while believing in the continuity of the hereditary material, follows Darwin under certain limitations. He allows of gemmules being thrown off which reach the reproductive cell, but only when there is a change of environment and a consequent disturbance of function. Further, the male and female reproductive cells have different functions in the economy. It is the male cell that especially collects these gemmules, and is thus the store for acquired characteristics; while the female cell transmits the more general resemblances.

We must not regard Galton's position as being in any sense a compromise between two divergent views. He arrived at it long before Weismann brought forward his hypothesis. And his intermediate and strong position is a striking illustration of the value of the inductive over the deductive method. As a piece of deductive logic, or, rather, of brilliant deductive speculation, Weismann's theory is a masterpiece; while Galton's is an equally remarkable example of extended inductive work.

Now, let us consider the bearing of this view that the hereditary material is continuous; and, first, on the parentage of the reproductive cells and their position in the cell community. The reproductive cells differ from all other cells of the body in the fact that they reproduce the whole individual, while other cells produce only tissues or parts of the body. This difference in function suggests a difference in nature. And the idea of continuity of the reproductive cells (or of the germ-plasm in them) has thrown great light on their unique character. They always tend to produce a whole individual, because they always come from one source, have one parentage,—viz., reproductive cells. As J. A. Thomson expresses it, in his comprehensive paper on the "History and Theory of Heredity," "They form a continuous chain, and the reproduction of like is as natural and necessary as it was in the protozoa." Thus "continuity is a great advance on pangenesis." In the idea of continuity we have a reasonable hypothesis to account for the uniqueness of the reproductive cells. So much for parentage.

Weismann goes further, and gives to these cells an isolated position in the cell community. While they have board and lodging in the community, they have nothing to do with it. This

raises a question which is of great interest to us as gynecologists. The presence of the reproductive part in the community and the changes in its activity exercise a great influence over the whole. To drop the metaphor, the facts of puberty and the menopause, and the effects of removal of the ovaries, point to a close connexion between the reproductive cells and the body generally. It would appear that, while from the point of view of parentage the reproductive cells are unique, their position in the colony is not one of isolation. This is, however, a subject which calls for closer scrutiny, and an important contribution may be made from gynecology as to the relation of the reproductive part of the organism to the organism generally. I know there is a difference of opinion in the minds of gynecologists with regard to the effect of removal of the ovaries on the organism as a whole. Tait minimises the influence, while Routh, in a paper read recently to the British Gynecological Society, accentuates it. It is a question worthy of careful investigation; and gynecology will throw much light on this aspect of heredity,—viz., whether the reproductive and the somatic cells occupy two distinct spheres which do not intersect. That it is so is the logical outcome of Weismann's theory, and it has to be tested by the facts.

There is another class of facts which have a bearing on this question, and which are also open to us specially for investigation. I mean the influences, if any, of a former sire upon the children. It is a recognised fact among breeders that the influence of a former sire may be seen on the offspring born to a second parent. This, whatever the mechanism by which it is brought about, shows that the influence of the father extends beyond the offspring, and affects the maternal organism—that we cannot limit the effects produced to the ovum which is fertilized. This is still more strikingly seen, as Darwin pointed out, in the case of certain plants in which the influence of the pollen is not limited to the ovules which they fertilize, but extends to the ovarium in which the ovules are lodged. This fact of the influence of the reproductive sperm-cell extending beyond the germ which it fertilizes, well-marked in the case of plants, less well-marked though still traceable in the case of certain animals, has not been established in the case of the human female. But here again careful scrutiny is required. Herbert Spencer's reason for the rarity of the occurrence in animals,—viz., that we should expect it to show itself only when one of the parents is of a very much purer strain than the other, may prevent its occurrence altogether in the case of man; but the first point to settle is, does it or does it not occur? This relation of the reproductive part to the body generally is one important question which has come to the front in these discussions on heredity, and is of especial interest to us as obstetricians.

Another important question is whether acquired characteristics

are inherited or not. This is an aspect of the question which should interest us as engaged in family practice. We have better opportunities than other scientific men of studying the characteristics of children, and noting to what extent they are the result of what may fairly be considered to have been acquired by the parents. For example, take such a case as this: a father who was astigmatic in the left eye, acquired as a lad a habit of writing with his head resting on his left hand, which he used to cover the defective eye. The defect in vision was cured by spectacles. His son and daughter both show the habit of resting the head on the hand while writing, although their eyesight is perfect. This case, as reported in *Nature*, gave rise to some discussion as to whether it was a case of acquired characteristics. Each case must be decided on its own merits, but I give this one as an example of the class of facts which are worth observing.

Then the results of disease are our especial study. The question of the transmission of disease would involve one in a discussion as to how much it is a case of the transmission of a tendency and how much of direct infection of the reproductive cells by germs. The transmission of "tendencies" to certain diseases, which seem to imply more than a constitution generally weakened, is a strong argument in favour of transmission of acquired characteristics, but it is one which requires fresh study. In contrast to the present scepticism with regard to the inheritance of acquired characteristics which Weismann has initiated, let me quote this suggestive opening sentence from Dr Maudsley's article on "Heredity in Health and Disease,"[1]—"The inheritance of parental or ancestral qualities of body and mind is a fact which has been taken notice of by all peoples in all times. It may justly be called an induction of universal experience, and in that character have as much weight ascribed to it as a modern scientific observation; for in a matter not requiring special means of research, but lying open to the common observation of all the world, the common experience of the race is wiser than the experiences of any individual. Are not the proverbs of a people for the most part more pregnant with wisdom than the lucubrations of its most ingenious philosopher?"

Even if Weismann's theory should be discredited, it will have done the great service of stimulating research along this line. The denial of transmission is an essential difference between his position and Darwin's; and yet this aspect of heredity, over which their views are so conflicting, is by far the most important and far-reaching one. Let me bring this out by an illustration.

Darwin's pangenesis implied that the material basis of heredity was made up anew in each generation. The parents were the central goods terminus, or rather starting-point from the city, into which lines converged from all parts of the country; each district sent in its quota of goods; these were sorted and arranged

[1] *Fortnightly Review*, xxxix. p. 648, 1886.

so that the train which finally left the goods-shed carried a fair sample of all the products of the country. Every place produced something,—it was a pangenesis.

We are now told, however, that this station is not a starting-point, but on the main line from somewhere else,—that the train was not made up here, but has come "through."

But are we therefore to abolish all local traffic, or say that only down trains run,—those from the city to the country? For this is what Weismann's theory implies. His hypothesis means as great a revolution in our views of life as if we were to awake to-morrow to find that our railway system had suddenly been seized with the idea of running only down trains. And as all the railway systems of the world are worked on one principle, such a change could not reasonably occur in this country without its obtaining in all countries. France and Germany would feel the change equally with ourselves. So to all provinces of life this revolution in thought must extend. As Herbert Spencer says, in his article to the *Contemporary Review* for October, "As influencing men's views about education, ethics, sociology, and politics, the question whether acquired characters are inherited is the most important question before the scientific world."

This weighty sentence from Herbert Spencer shows how far-reaching the problem is, and with what caution we must proceed. The probability is that some middle ground between the extreme positions of Darwin and Weismann will be found to be the firm one,—that while receiving the new we shall not drop the old. The influence of some of these new ideas will be wide and deep.

Germinal continuity joins man to an ever-broadening ancestry. Instead of a block of marble out of one quarry, he is a mosaic.

Variation by sexual mingling accentuates the significance of marriage. If, as Venus says to Adonis,—

> "By law of nature thou art bound to breed,
> That thine may live when thou thyself art dead,
> And so, in spite of death, thou dost survive,
> In that thy likeness still is left alive,"

the fact that it is a "breeding" is emphasized. Marriage in relation to disease will begin to receive the attention it deserves.[1]

The importance of raising the average, if you are to advance the race, will be recognised. Galton's views on social heredity give a *rationale* for our modern national education system. The tendency to gravitate towards the mean is made an argument for raising the average.

While accepting the new, we shall not drop the old; while

[1] As in Dr Strahan's book on *Marriage and Disease; a Study of Heredity and the more important Family Degenerations.* London, 1892.

absorbing the new ideas from germinal continuity, we shall not lose what was embodied in pangenesis; in linking a man on to the chain of remote ancestry and to every man round him to-day, we shall not miss his connexion with what has immediately preceded and produced him,—we shall still share the happiness which Iphigenia longed for:

> "Happy who with a bright regard looks back
> Upon his father's father, who with joy
> Recounts the deeds of grace, and in himself
> Values the latest link in the fair chain
> Of noble sequences; for Nature loves
> Not at one bound to achieve her topmost type,
> But step by step she leads a family on
> To demigod or devil, the rare joy
> Or horror of the world."

IV. A CASE OF LABOUR WITH CARDIAC AND RENAL COMPLICATIONS.

By W. Ramsay Smith, M.B., C.M., B.Sc. (Edin.), late Senior Assistant to the Professor of Natural History, Edinburgh University; Demonstrator of Anatomy, Edinburgh School of Medicine; and Examiner to the Royal College of Physicians, Edinburgh; Rhyl, North Wales.

A perusal of Tarnier's paper on "Labour and Heart Disease," in the *Journal des Sages-Femmes* of 16th January 1894, induces me to report the following case, which was brought to a successful issue by following the principles strongly insisted on, if not first laid down by the Edinburgh School of Midwifery.

On 15th October 1893 I was called in to attend Mrs R., who was expecting her confinement every day. The medical man in attendance had retired from the case, because the patient "refused to allow him to do what he considered necessary for her relief."

I found the woman in great pain; her screams had been alarming the neighbours. The whole body presented all the features of Bright's disease; the limbs and face were immensely swollen; but what she complained of most was excruciating pain at the vulva. The labia were turgid, anasarcous, and swollen to about the size of a fœtal head; and they had been incised, in order to give the patient relief from pain.

There was a very distinct "double aortic" murmur. The heart was hypertrophied, and I found no evidence of dilatation. The kidneys had almost ceased to act; no water had been passed for nearly twenty-four hours.

The first thing to be done was to deal with the swollen labia. The pain was relieved at once by continuous elastic pressure, and the swelling gradually subsided. Then a course of action had to be decided on. The facts to be considered were these: The woman was worn out by pain, wakefulness, and want of nourish-

ment; there appeared to be heart disease; there was albuminuria in a very high degree; and the fœtus in the uterus was alive.

The patient was put under treatment immediately, following the general lines laid down for the treatment of albuminuric cases—purgatives, diaphoretics, diuretics, and diet. In a week she was out of bed looking after her household duties (she *would* do this; the worry of staying in bed was worse for the heart than the work of getting up), and gathering strength for her confinement.

On 25th October, ten days after I first saw her, I was summoned to attend her in labour. The labour had been progressing fairly rapidly; the os was sufficiently dilated. With the patient deeply under chloroform I ruptured the membranes, applied forceps, delivered the child without delay, and expressed the placenta. I did nothing to discourage the pretty free hæmorrhage. The second and third stages were completed within twenty minutes of my being called. The patient never bore the brunt of a pain after the membranes were ruptured.

For a few days after labour the woman's condition was all that could be desired. The dropsy was disappearing, the urine was being passed freely, and contained no albumen. Then troubles began. Contrary to orders, and despite all warnings, the patient got up on the sixth day after confinement, caught a chill, and then came all the difficulties of an acute nephritis. To give the history of this and of other complications would prove tedious and uninteresting, especially as the narrative has but little bearing on the true purpose of this paper. The only fact worth mentioning is that at the present day the woman is perfectly well, free from albuminuria and dropsy, and the heart is normal in size, and absolutely without trace of a murmur. The child is alive and healthy.

The points I would emphasize in the treatment of this case are these:—(1), Allowing the pregnancy to go on till full time,—there was no indication for interference, and the delay allowed the patient to recover her strength; (2), administering an anæsthetic, applying forceps, and completing the labour as early as possible; (3), treating other complications on general principles.

MEETING II.—DECEMBER 12, 1894.

Dr A. H. FREELAND BARBOUR, *President, in the Chair.*

I. The following gentlemen were elected Ordinary Fellows of the Society:—Gopal Giovind Vatve, M.D. (Brussels), L.R.C.P. & S. Ed., Bombay; Robert William Beesley, M.B., C.M., 13 Gladstone Terrace; W. A. Stephen, M.A., M.B., Maternity Hospital; W. E. Fothergill, M.A., B.Sc., M.B., Maternity Hospital; George S. Brock, M.B., C.M., Lauriston Gardens; F. W. Mackay, M.B., 39 Morning-

side Drive; and John M. Munro Kerr, M.B., C.M., 28 Berkeley Terrace, Glasgow.

II. *Professor Simpson* showed—(*a.*) MALFORMATION OF A FŒTAL LIVER in which there was extensive fusion between the right and left halves below the ductus venosus; (*b.*) PELVIC ORGANS AND DUODENUM of a patient who died from perforating duodenal ulcer after myomectomy; (*c.*) A SPANISH DELIVERY-PAN.

III. *Dr Haultain* showed a DEAD-BORN FŒTUS with complete fusion of the digits in both hands and feet. There was also a slight amount of hydrocephalus. The condition was associated with marked hydramnios.

IV. *Dr W. E. Fothergill* showed a CAST OF A DOUBLE CEPHALO-HÆMATOMA.

V. *Dr J. W. Ballantyne* showed—(*a.*) A FŒTUS WITH RETRO-FLEXION OF THE SPINE AND ANENCEPHALY, which had been sent to Professor Simpson by Dr Duff of Helensburgh, and handed to him for examination. The mother of the fœtus was 41 years old and a xiv.-para. Her first pregnancy ended in abortion at the third month; this was followed by several normal pregnancies and by seven gestations, which either ended prematurely or at the full time, but with dead infants. The pregnancy preceding the present one was plural; it terminated at the seventh month, and the twins lived only a few days. The fœtus now shown was the product of the fourteenth conception, and was born at the seventh month; the presentation was a footling; nothing abnormal was noted in the placenta and membranes; there was hydramnios, and the umbilical cord was about 12 inches long. With regard to the question of heredity, the father stated that he believed that one or two of the dead-born infants had a malformation of the spine, and, further, one of his family—a girl—had been operated on for spina-bifida (apparently). This association of spina-bifida and spinal retroflexion in the same family was noted in another case by Dr Ballantyne (*Edin. Obst. Soc. Trans.*, xviii. p. 226, 1893). The fœtus, a female, weighed 1520 grammes, and had a length of only 25 cms. The smallness of this measurement was due, first, to the fact that the fœtus was anencephalic; second, to the shortness of its body from retroflexion of the spine and lateral distortion; and third, to the sharp flexion of the legs upon the thighs. The appearances were those met with in fœtuses with anencephaly conjoined with complete spina-bifida and spinal retroflexion. So great was the retroflexion in this instance that the basis cranii was not far removed from the sacrum, and, in addition, the spine was bent to the right side, causing the fœtus to be asymmetrical. The subcutaneous tissue was very plentiful, the ears were deformed, and there was no

indication of a constriction to mark the neck. The hands and feet were not deformed.

(*b.*) The URINARY ORGANS OF A STILL-BORN INFANT, which had been sent to him by Dr W. Cardy Bluck of St Mary's Day Nursery in Plaistow. The organs showed DILATION OF THE BLADDER AND URETERS, and HYDRONEPHROSIS. The history, as given by Dr Bluck, was as follows:—The mother was 37 years old and a vi.-para. The five previous children are all alive, but are delicate and rachitic. In the present case labour came on at the eighth month; the presentation was vertex, position L.O.A.; labour lasted eight hours (first stage four hours, second stage four hours), and the pains were infrequent and feeble; the amount of liquor amnii was estimated at not more than one fluid ounce, and the infant was still-born. The father was a strict vegetarian, and confined his family chiefly to milk and bread. The infant—a male—weighed 5½ lbs., and had talipes varus of both feet and drop-wrist of the right hand. A rounded tumour could be felt on the left side in the abdomen. When the abdomen was opened, the bladder was seen to be greatly distended, as were also the ureters; in fact, the latter were enormously dilated and convoluted. There was also bilateral hydronephrosis, but the renal change was more marked on the left than on the right side. Fluid regurgitated easily from the bladder into the left ureter, but not into the right. The urethra was found to be occluded near to the meatus urinarius. A most interesting feature of the case was the association of oligohydramnion with imperforate urethra and distention of the whole urinary apparatus. It seemed difficult to avoid the conclusion that the liquor amnii, at any rate in the later months of gestation, is derived, in part at least, from the renal secretion of the fœtus.

VI. *Dr James Ritchie* showed an ORGANIZED UTERINE BLOOD-CLOT passed with great pain at a menstrual period.

VII. ON A DELIVERY-PAN IN USE AT THE PRESENT TIME IN SPAIN.

By A. R. SIMPSON, M.D., Professor of Midwifery and the Diseases of Women and Children in the University of Edinburgh.

THE writings of Ploss[1] and Witkowski,[2] and the researches of Dr Engelmann[3] and our own Fellow Dr Felkin,[4] have shown that a remarkable diversity of practice has prevailed among different races and at different epochs in regard to the position assumed by

[1] *Ueber die Lage und Stellung der Frau während der Geburt*, Leipzig, 1872; and *Das Weib in der Natur- und Völkerkunde*, Leipzig, 1887.
[2] *Histoire des Accouchements chez tous les peuples*, Paris, 1887.
[3] *Labor among Primitive Peoples*, St Louis, 2nd Ed., 1883.
[4] *Transactions of the Edinburgh Obstetrical Society*, 1883–84.

the parturient woman and the provision that is made for her comfort.

In the second volume of the latest work of Ploss, edited by G. Bartels (p. 174), eight different labour positions are tabulated, with the regions and races where they are respectively adopted. The positions are,—1. Lying; 2. Half-lying or leaning backwards; 3. Sitting; 4. Squatting (*Scottice* Hunkering); 5. Kneeling; 6. Standing; 7. Hanging; 8. Swinging.

Of the provision made for parturient women in the sitting posture, the most widely diffused was some kind of stool or chair, and many eminent accoucheurs expended much ingenuity in their construction. Kilian[1] gives a list of thirty-one different authors whose names are associated with birth-chairs of various form. Perhaps the most famous of these is the Deventer Chair, regarding which Schroeder[2] tells us that every well-plenished bride in Holland was expected to have one as part of her trousseau.

Deventer[3] himself devotes several pages to the description and mode of use of his delivery-chair, and concludes,—"From all that hath been said, it is easy to judge how useful a chair well fitted is for child-bearing; but on the contrary, if ill contrived, only a troublesome lumber, scarce fit for any other use than to burn. This whole chair, with the four doors, and another seat put into a sack, may easily be carried by any man, and therefore by no means too heavy for the use of cities and towns; and it is a thing to be wished for, that every midwife were furnished with such a chair; and whoever cannot take the proportion from the figure, they may come to my house and see my chair, if a workman can make them one by mine."

Moschion, among the requisites of the lying-in room, reckons a "sedile obstetricium, Cathedræ simile," and asks in Cap. xvlii., according to his Latin editor Devez, "Quale est sedile obstetricium?" and answers, "Consulari sedi simile, in quo sic sedet, ut sub sexu habeat foramen in lunæ formam excissum, ut illac fœtus excidere possit."

One seems to hear an echo of the ancient author in the earliest work that was published for the instruction of midwives in England, *The Birth of Mankinde*, by Raynalde, who says,—"Now when the woman perceyveth the matrix or mother to waxe laxe or loose and to be dissolved and that the humors issue foorth in great plentie, then it shall be meete for her to sit downe, leaning backeward in manner upright; for which purpose in some regions (as in Fraunce and Germanie) the midwives have stooles for the nonce, which being but lowe, and not high from the ground, be made so compassewise and cave or hollowe in the middle, that

[1] *Die Operative Geburtshülfe*, Bonn, 1849, p. 125.
[2] *Lehrbuch der Geburtshülfe*, Bonn, 1871, p. 151.
[3] *The Art of Midwifery Improved*, 4th Edition of English Translation, London, 1746.

that may be received from underneth which is looked for, and the back of the stoole, leaning backeward, receiveth the back of the woman."

The chair sometimes belonged to an institution; and there may still be seen in the Obstetric Museum of our University the labour-chair that was in use last century in the room with six beds in the top storey of the Old Infirmary, that was assigned to Professor Young as an Obstetric Ward. Sometimes the chair was provided by the doctor; and I show you a portable chair which answers to Moschion's description, and which was in use in Malta a generation ago. It was sent to Sir James Simpson by his and my friend, Dr Pisani, whose father had employed it in his practice. Raynalde's sentence, which is simply a translation from Roesslin's work, indicates that in France and Germany it was the midwife who owned the birth-stool; whilst in Holland, as appears from the remark I have quoted from Schroeder, it was part of the patient's own furniture.

But whilst many authorities were vaunting the value of such chairs, already in the seventeenth century Eckarth is found, as Ploss (vol. ii. p. 179) tells us, inveighing against them in these terms:—"When one looks at the construction of an agony chair, you see it is a real chair of pain and instrument of torture. When the sufferer should have her best rest, there is a ledge three or, in special cases, four fingers broad; it is little wonder that these poor people break in bits their loins and backs, and faint from the severity of the sufferings. O! cursed contrivance, I say, the infernal *Proserpina* was the inventor of it."

Although seats of various fashions have been described as of wide and long-continued use, I find no mention made of a utensil which is sold in the china merchants' shops in Spain, and used as a seat by women in labour at the present time. The pan I show you now (see Fig.) I owe to the kindness of my friend and former pupil, Dr R. Russell Ross, who is the Medical Officer in charge of the employés of the Rio Tinto Mining Company in Huelva, in the south of Spain. He had been called in to consult in a difficult case, and writes that when he first saw the patient he "found her sitting on a similar pail to the one sent—her legs wide apart, and a midwife in front on a low stool examining *p. v.* through the aperture in the jar; the waters, blood, etc., being collected in the bottom of the receptacle."

The vessel is made of strong glazed earthenware, and resembles entirely the pan of a close-stool, except for the excavation on one side through which the hand of the attendant gets access to the patient's pudenda, and through which the child can be guided forward. It is $11\frac{1}{2}$ inches in depth in the interior, and $6\frac{7}{8}$ inches in width at the bottom. At the brim it measures 10 inches in diameter, extending to $15\frac{1}{4}$ inches at the outer margin of the flange, on which the patient sits, and which is $2\frac{3}{4}$ inches broad.

SPANISH DELIVERY-PAN.

The aperture in the side extends half-way down for a depth of 6 inches from the inner edge of the flange, and at its upper end is 5½ inches wide at the inner margin of the flange.

Dr Ross has made enquiries of his medical confrères in Seville and the capital of Huelva, but has not been able to ascertain from them that mention is made of this utensil in any obstetric work. It is spoken of by the natives usually as *Bacin*, the same designation as is given to a large pan or basin which serves as a close-stool or slop-pail. Sometimes it is called *Recado*, a tool or implement, or *Parideras*.

There seems to be very little known as to the obstetric usages of the Spaniards, else some notice of this delivery-pan would have been taken by the writers to whom I have referred. All that Ploss (*Ueber die Lage*, etc., p. 30) has to say about Spain is that "the use of the birth-chair came early into Spain through the Arabs, whose physicians certainly introduced it there amongst the people. Perhaps it is still to be found there; at least Hureau de Villeneuve (*Thése*, Paris, 1863, p. 31) says, 'The Spaniards often make use of a sort of arm-chair open in front.'" But this solitary sentence occurs in an essay on Labour among the Yellow Races, in a paragraph which briefly indicates the customs in different countries in Europe, and cannot be taken as authoritative.

For aught we know the delivery-pan which Dr Ross saw in use last summer may have been in use in Spain long before the time of the Arabians. However that may be, if the woman in labour were to be put in a sitting posture she would find this simple kind of seat more serviceable and safe from a sanitary point of view than any of the chairs produced by the ingenuity of the master minds in obstetrics of other countries and other generations.

VIII. SIMULATION OF PREGNANCY AND ABORTION BY VESICAL HÆMORRHAGE AND BLOOD-CLOT.

By F. W. N. Haultain, M.D., F.R.C.P. Ed., Lecturer on Midwifery, etc., Edinburgh School of Medicine.

In September last I was asked by Dr Mackay to see with him a girl of about 18 years of age who was suffering from erysipelas, and at the same time was supposed to be bleeding very profusely from the vagina.

On arrival I found the patient almost pulseless, and with all the appearance of having lost a large quantity of blood. I was told that by means of a vaginal plug the hæmorrhage had been controlled for more than three hours, and that on its removal, a short time previous to my visit, the vagina had been douched without the loss of another drop of blood.

On attempting to make a vaginal examination the patient resisted

with all her power, and I therefore had great difficulty in making out the exact condition of parts, but the vagina seemed roomy and the cervix small and nulliparous, while in the anterior fornix was a soft mass about the size of a goose's egg. The history showed three months' amenorrhœa, with a similar attack of flooding a fortnight ago, upon which occasion her mistress, from the condition of her bed, had accused her of having had a miscarriage, and had given her her "congé." As is usual in these cases, she stoutly denied all illicit intercourse.

On account of her extremely precarious condition, I considered it would be unwise to give her chloroform, so as to make a more satisfactory examination; I therefore ordered the vagina to be again plugged, as I thought her to be losing blood from a threatening miscarriage, and I further proposed that a quart of saline solution should be injected into the rectum, as far as possible to restore the now almost imperceptible pulse.

On returning the following day, I was pleased to find the pulse much improved, and the patient somewhat stronger; and as Dr Mackay informed me that he had removed and replaced the plug without the least appearance of further hæmorrhage, I decided to leave well alone, and defer further examination for yet another day. About an hour after I had left, the patient, in spite of much previous warning, attempted to sit up in bed, and suddenly collapsed and expired.

On post-mortem examination I was, to say the least of it, surprised to find the pathological conditions I now show to you, viz., the uterus normal in size and position, but the bladder much dilated and hypertrophied, and within its cavity a blood-clot about the size of a large hen's egg, which was organized, and adherent to the base of the organ. The right kidney was much enlarged, and on section was found to be full of small abscesses, the pelvis of the organ being much destroyed by tuberculous ulceration.

The bladder wall was extremely congested, and its mucous lining so thinned that it is doubtful if it is on several parts present at all; but, curiously, there cannot be found, so far as I can make out, any ruptured vessel of sufficient size to account for the excessive hæmorrhage from which she suffered, and which evidently must have come from the bladder, as there was no appearance in the ureter of blood-staining, as would have been present in a recent renal hæmorrhage.

The case presents so many points of both pathological and practical clinical interest that I have thought it worthy of bringing it before your notice.

It is doubtless easy in most instances to see, on careful reconsideration, how one's mistakes might have been avoided, or at least to satisfy one's conscience by pleading extenuating circumstances, which latter I feel I might with all propriety do, considering how unmanageable my patient was. But the signs and symptoms of

pregnancy and abortion were here so closely simulated that I cannot help thinking that, even had the conditions been ever so favourable, I would still have had great difficulty in arriving at a correct diagnosis.

Firstly, the history of amenorrhœa was, when taken with the size of the supposed uterine tumour, distinctly suspicious, while corroborative evidence was not far to seek in the roomy vagina, the soft mass in the anterior fornix, seemingly continuous with the cervix, and the profuse recurring hæmorrhages. No doubt the consistence of the cervix was negative, but it is well known that softening is in some cases by no means well marked in the early months of gestation. In the same way the mass in the fornix, though distinctly low, did not preclude the possibility of it being uterus, as a high degree of anteflexion is not unknown in early pregnancies.

Any attempt to discern pulsation in the fornix vaginæ was out of the question, on account of the restlessness of the patient. Further, it is more than probable this valuable sign would here be in abeyance, as the patient was so exsanguine that a radial pulse was barely present. It might be argued that the source of the hæmorrhage should have been more thoroughly investigated; but when one considers its continuous character, independent of the act of micturition, it was almost legitimate to take it for granted that it came from the vagina. Further, at the time of my visit there was and had been no hæmorrhage for at least three hours, and immediately before, the vagina had been douched thoroughly with hot water.

The continuous character of the vesical bleeding is both peculiar and interesting, and is to be attributed to the presence of the blood-clot, which prevented the contraction of the sphincter vesicæ, which in a similar manner causes the urinary incontinence so frequently met with in vesical calculus.

From all points the case would appear to be fraught with a series of symptoms and signs which tend more to disguise than to aid one in arriving at a correct diagnosis.

By mistakes we learn; and therefore I trust this record may be the means of preventing a similar failure in like circumstances. Fortunately, I can deaden any pangs of conscience—in so far, at least, as the ultimate issue of the case is concerned—as a correct diagnosis would have proved of little avail to the patient, my only cause for remorse being the false impeachment which was made on the girl's character, and which it is now impossible to rectify.

Dr Darling stated he had, while house-surgeon with Prof. Annandale, seen a case with very similar clinical characteristics. On the autopsy in this case a small sarcoma of the kidney was the cause of the patient bleeding to death.

IX. A CASE OF RIGOR MORTIS IN THE FŒTUS.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E.

On the 21st of November 1894 Dr D. Milligan brought to me for examination a male fœtus which showed the condition known as fœtal rigor mortis, or antenatal cadaveric rigidity.

The mother was a healthy ii.-para. Her first pregnancy had terminated prematurely at the sixth month as the result of a fall. She calculated that the present pregnancy (her second) ought to end on the 9th of February 1895; but on the 19th of November she stated that she thought the fœtus was dead, giving as the sole reason for this belief the absence of fœtal movements. Two days later (November 21st) labour pains supervened. The head presented in the normal position, and labour lasted for about four or five hours, the child being born about 3 P.M. The placenta was expressed, but it was not adherent. The infant's heart did not beat at birth, nor was there any pulsation in the cord during delivery.

Dr Milligan noticed that at the time of birth the infant's left arm was sharply and firmly flexed at the elbow. The limb could not be unbent beyond a right angle, and when attempts to extend it were made the biceps muscle could be distinctly seen forming a marked projection in the upper arm. There was a similar but less noticeable condition of the right knee. The state of the muscles of the jaws was not observed. The head and neck were markedly cyanotic. About a quarter of an hour after birth both the arm and leg could be straightened, but some resistance to extension was still met with, and Dr Milligan then recognised that he had to do, not with a dislocation or an anchylosis of the elbow and knee joints, but with a muscular contraction. Two hours later (5 P.M.), when I saw the fœtus, there was still considerable stiffness of the elbow, and the biceps was still unusually prominent; soon thereafter, however, these signs quite disappeared.

The fœtus, a male, weighed 1220 grammes, and had a total length of 40 cms. It had the appearance of a fœtus of about six and a half months. The nails were not quite at the ends of the digits, and the pupillary membrane was still present. It was not deformed in any way, neither did it show any signs of maceration.

The placenta weighed 270 grammes, and measured 11 by 14 cms. It had an irregular shape, for it consisted of two parts, one of which was much larger than the other, which were united by a narrow bridge of placental tissue, near which the cord was inserted into the larger of the two parts. On the maternal surface of the afterbirth, and near its margin, was a large and comparatively recent black blood-clot. The placental substance, however, showed no hæmorrhage, and had a normal appearance. The membranes

also showed nothing worthy of note. The cord was 37 cms. in length, and showed no knots or abnormal twisting.

The body of the fœtus was opened, and it was found that the viscera were normal in appearance, save for a somewhat intense degree of congestion. There were no intra-cranial hæmorrhages, neither was there any sanguinolent fluid in the body-cavities. There was no abnormality of the knee or elbow joints. The testicles were still in the abdomen, and the large intestine contained a considerable quantity of meconium. There was no desquamation of the cuticle.

That this was a case in which death had occurred and rigor mortis supervened *ante partum* I do not doubt. Probably at the time of birth the cadaveric rigidity had partly passed off, leaving only a contracted state of the left arm and right leg. So few cases illustrating this condition have been noted that this instance is well worthy of record.

Antenatal Rigor Mortis.

Very few cases of rigor mortis in the fœtus have been described, and one is therefore hardly warranted in drawing general conclusions concerning this morbid state; but it may be useful to gather together what has been written on the subject, and at the same time to point out the details with regard to which further information is needed. Including the case which I have just narrated, about twenty-five instances of fœtal rigor mortis have been put on record; and the references to these will be found in the bibliographical list at the end of this paper. In the paper itself the individual cases will be referred to by the numbers attached to them in the aforementioned list.

Definition.

Rigor mortis may be defined as that state of rigidity of the muscles with stiffness of the limbs and joints which invariably follows death in an animal provided with a muscular system; and antenatal rigor mortis is that same condition when it occurs in the fœtus *in utero* either before labour or during the process of parturition. In this paper I shall deal only with rigor mortis as it affects the human fœtus.

Historical Notes.

The first recorded case of antenatal rigor mortis seems to have been that noted by Chowne (1) in 1840. It is true that he did not himself see the infant at the moment of its birth, and that it does not seem to have struck him that the rigidity which he observed three-quarters of an hour later might have been present *ante partum;* but from the statement of the midwife and the details of the case, I am inclined to regard Chowne's observation as one of true fœtal rigor mortis.

Some years later, Casper, in his *Forensic Medicine* (New Sydenham Soc. Trans., i. p. 29), made the following statement:—"*I have never observed cadaveric stiffening in the immature fœtus.* Since, however, the phenomenon has been observed by others, particularly in maternity hospitals, even in such fœtuses,—though, as they themselves confess, it is always in such cases only feeble and transitory,—so, though we cannot positively deny its occurrence in such fœtuses, yet it is non-existent so far as the medico-legal dissecting-table is concerned, since their bodies never come so early to it. Even in the case of mature new-born infants and little children, the cadaveric rigidity is feeble and transitory." It is not quite clear what was the exact nature of the maternity hospital observations referred to by Casper, but probably they were cases in which rigor mortis supervened after the birth and subsequent death of immature fœtuses, and there is no proof that the distinguished medical jurist was acquainted with any case of antenatal cadaveric stiffening.

The second case on record was that reported by Schultze (2), in the year following the publication of the first edition of Casper's work, viz., 1857. The mother, in this instance, was three days in labour, and then by the help of forceps gave birth to a dead infant, which was quite rigid ("vollkommen leichenstarr"). Concerning this record, Schwartz (*Die vorzeitigen Athembewegungen*, p. 230) says that its most astonishing feature was the cadaveric rigidity; and it may, therefore, be concluded that the case was by him regarded as unique.

Taylor (*Medical Jurisprudence*, 1st edition, p. 15, 1865) relates Chowne's case, but does not state whether, in his opinion, the rigor mortis was present before the birth of the infant or not. Curtze's observation (3) was published in 1866; and in 1870 Tourdes (4) noted that in Strasburg cadaveric rigidity had been observed in twin fœtuses at the fifth month of the intra-uterine existence.

In 1874 an interesting series of cases (5, 6, 7, 8, and 9) appeared in the *British Medical Journal*, along with an animated discussion as to the true nature of the rigidity which was present at birth. Grigg (5), P. A. Young (7), and Parkinson (8 and 9), all regarded it as rigor mortis, while Ashburton Thompson was at first strongly inclined to consider it as a tetanic spasm occurring in *articulo mortis*, and persisting after death. In 1876 Bailly (10) reported a case in a twin confinement; and whilst he suggested that the infant may have been surprised by death in an eclamptic seizure, he evidently inclined to the belief that it was cadaveric rigidity. In the next year (1877), Martin (11 and 12) put two cases on record; and Pinard in his article on the Fœtus (*Dictionnaire encylop. des Sciences méd.*, 4th ser. ii. p. 548, 1878), announced his conviction that the rigidity was truly of the nature of rigor mortis, and affirmed that its presence might make the delivery of the infant difficult.

In 1880 L. W. Müller (13) and Dagincourt (14, 15, and 16) both wrote on the subject and described cases; and in the same year O. Hourlier (*De la mort du Fœtus*, Thesis, Paris, p. 76, 1880) agreed with these writers in thinking it to be true rigor mortis, and gave notes of two cases, which seem, however, to have been the same as those reported by Dagincourt. C. Meymott Tidy (*Legal Medicine*, i. p. 71, 1882) evidently regarded the cases published in the *British Medical Journal* in 1874 as genuine examples of rigor mortis, for he made the following medico-legal deductions: "The existence of rigidity in a newly born child may be regarded as a proof that it has lived in the physiological but not necessarily in the legal sense,—*i.e.*, that the child exhibited signs of life after it was completely external to the mother." In 1883 Charpentier (*Traité pratique des Accouchements*, i. p. 959) reviewed all the evidence that had been brought forward upon the subject, and inclined to the belief that it was true cadaveric rigidity, and not cadaveric spasm.

Since 1880 several new cases have been put on record. They were those of Boxall (17), Jones (18), Davidson (19), Stumpf (20), Sänger (21), Dohrn (22), Feis (23), and Lange (24). In some of these (Nos. 17, 18, and 19) the fœtal rigidity was evidently the cause of dystocia; and Dohrn's case was specially interesting, for in it the infant, although not actually dead-born, was certainly moribund at birth, and was nevertheless rigid. Feis (23) summarises the whole subject, and quotes from literature eighteen cases in addition to his own. I have found notes of six other instances, including that met with by Dr Milligan and described above. The condition was also discussed by Tarnier and Budin (*Traité de l'art des Accouchements*, ii. p. 365, 1886), who sum up strongly in favour of the theory that we have to do with true cadaveric rigidity, and not with a contracture coming on during life and persisting after death; at the same time they confess that our knowledge of the subject is still very imperfect. This reproach has, however, been to some extent removed by recent researches, and especially by those of Tissot (26).

Clinical History.

Several of the recorded cases give scarcely any details beyond the statement that the infant was rigid and dead when born; but of others there is a fairly complete clinical picture. It may be useful to summarise these details, so as to learn whether any conclusions concerning the nature and mode of origin of the fœtal rigidity can be drawn from them.

(1.) *Mother's Age and Parity.*—In some instances the mother's age at the time when she gave birth to the morbid fœtus was stated; thus it was 20 years in No. 6, 26 in Nos. 7 and 14, 29 in Nos. 17 and 22, 32 in Nos. 13 and 19, 35 in No. 10, 36 in No. 24, 37 in No. 15, 38 in No. 8, and 44 years in No. 2. With regard to

parity, she was a i.-para in Nos. 2, 6, 7, 9, 10, 14, 19, and 22; a ii.-para in Nos. 20 and 25; a vi.-para in Nos. 13 and 17; a vii.-para in No. 23; a x.-para in No. 18; and a "multipara" in Nos. 3, 5, 8, 15, and 24.

(2.) *Mother's Health and previous Obstetric History.*—In five cases (Nos. 7, 17, 23, 24, and 25) it was definitely stated that the mother was quite healthy; and this was probably the case in most of the other instances, although there was no information on the point given. Details concerning her previous confinements (in the case of multiparæ) were also seldom forthcoming; but in Nos. 13 and 17 she had had five earlier normal labours, in No. 23 she had had six such; whilst in No. 8 she had had two or three miscarriages, in No. 25 a premature confinement at the sixth month, and in No. 24 there had been placenta prævia on three former occasions.

(3.) *History of Pregnancy and Labour.*—The details of the pregnancy which resulted in the birth of a dead and rigid fœtus are so closely connected with those of the labour itself that it will be best to consider them together.

In two instances (Nos. 4 and 10) the pregnancy was plural (twins); but in all the other cases it was single. In most of the recorded observations it would seem that the gestation was not interrupted (Nos. 5, 6, 7, 8, 13, 14, 17, and 23); but in some instances labour came on shortly before the full term (Nos. 10, 16 (?), 20, and 24), in one case (No. 15) at the eighth month, in one (No. 25) at six and a half months, and in one (No. 4) at five and a half months. Information concerning the age of the pregnancy was not forthcoming in Nos. 1, 2, 3, 9, 11, 12, 18, 19, 21, and 22. In no case could the labour be termed quite normal. In most instances the head presented (Nos. 1 (?), 2, 3, 5, 6, 7, 8, 10, 13, 14, 16, 17, 18, 19, 22, 23, 24, and 25); but in No. 2 the position would seem to have been R.O.A., and in No. 13 the cord was prolapsed in front of the head. There was placenta prævia in Nos. 5, 12, and 15; and in No. 11 the breech presented.

The labours differed very much in character, and as a rule operative interference was necessary to complete the birth of the infant. The natural efforts, however, were sufficient to expel the child in Nos. 1, 5, 11 (?), 20, 24, and 25. In certain cases (Nos. 2, 3, 6, 7, 10, 13, 14, 16, 17, 18, and 19) the forceps, with or without manual traction and other means of expediting delivery, were necessary; in Nos. 8, 15, and 23 traction with the hands was all that was required; and in Nos. 12, 21, and 22 Cæsarean section had to be performed after the death of the mother, from hæmorrhage in Nos. 12 and 21, and from eclampsia in No. 22.

It is necessary, however, to consider the labours more in detail; and for this purpose it will be well to arrange them in groups according to the most evident cause of delay or danger met with in the individual cases.

In one group, which includes three cases (Nos. 5, 12, and 15), there was *placenta prævia*. In No. 5 labour pains set in and were shortly followed by severe hæmorrhage. In about an hour and a half afterwards, with the full dilatation of the os uteri, the bleeding had nearly ceased, but as a piece of placenta could be felt the membranes were ruptured, and the infant was then expelled almost in one pain; some firm ("flesh-like") clots came away with the placenta, and there was slight post-partum hæmorrhage; and during the puerperium the mother suffered from adhesive phlebitis of the veins of the right thigh and leg. In No. 12 the mother had for three days had severe hæmorrhage; this bleeding, which was due to placenta prævia, proved fatal; and eight minutes after the death of the mother (with the membranes still intact) Cæsarean section was performed. Hæmorrhage set in at the eighth month of pregnancy in No. 15; it was due to placenta prævia, and as the os dilated slowly a tampon was introduced, and thereafter the infant was extracted manually without difficulty.

In a second group of cases labour was also complicated by bleeding; but now the hæmorrhage was from the premature separation of a normally (or nearly normally) inserted placenta. The cases of *accidental hæmorrhage* were Nos. 1, 17, 23, 24, and 25. In No. 1 there had been bleeding in labour, but the natural efforts had sufficed for the birth of the infant before the arrival of the medical man, a midwife having been in charge. In No. 17, two days before labour set in, the mother stated that the fœtal movements were stronger than usual, and "something seemed to go pop inside the womb"; immediately thereafter she felt faint, and for the two succeeding days suffered from a prickly pain in the abdomen and had several rigors; labour then commenced with sudden flooding, and the patient was brought into hospital. The membranes were intact, and at the beginning of each pain there was a gush of sero-sanguinolent fluid; the membranes were ruptured artificially, but as the head did not come down forceps were used to extract it; although strong pains continued, the trunk was arrested and there was no movement of restitution, therefore the labour was completed by means of supra-pubic pressure and traction. The placenta was expelled naturally, and showed about 12 oz. of recent clot adhering to its maternal surface, which was smooth, yellow, and fatty in appearance; in the substance of the afterbirth, also, were two fibrous masses, one as large as an almond, the other the size of a bean. In No. 23 there was also a great loss of blood during labour: the os dilated slowly and the head was born without assistance, but traction was needed to deliver the trunk; the cord was coiled once round the neck and once round the left leg of the infant; and a mass of fluid blood and clots came away with the placenta, about one-third of the uterine surface of which was also covered with clotted blood. In No. 24 (Lange's case) uterine hæmorrhage came on while the

patient was sitting quietly at table, at which time very strong fœtal movements were felt, but none afterwards; the os was partly dilated, so the membranes were ruptured; the hæmorrhage ceased, the pains increased in strength, and the child was born about three hours later; much blood came away with the placenta, and about one-third of the uterine surface of the afterbirth was covered with firm blood-clot; and the opening in the membranes was about 2 cms. from the placental border. No. 25, the case which I have narrated, had, as will be remembered, a history very similar to that in Nos. 23 and 24.

In association with these two groups, in which hæmorrhage was the chief complication of labour, it is necessary to place the case recorded by Sänger (No. 21), in which the mother died of bleeding from a burst varix, and in which Cæsarean section was performed four minutes post-mortem.

In a third group may be placed the confinements that were complicated by *eclampsia;* of these there were two (Nos. 20 and 22). In the former instance labour came on prematurely with eclamptic seizures, a dead and rigid fœtus was born, and thereafter the mother died in a state of deep coma; at the autopsy there was found acute yellow atrophy of the liver, and acute nephritis. In No. 22 eclampsia came on in pregnancy in a primiparous woman with albuminuria, but without œdema; the pains were few and weak, and the os remained closed; after thirty-nine eclamptic fits the patient died, and Cæsarean section was performed, and a moribund infant extracted from the uterus four minutes after the death of the mother. In No. 19 there were some symptoms that may have indicated an eclamptic tendency.

In a fourth group were five cases in which labour was delayed on account of *contraction of the hard and soft canals.* In No. 2, in which labour lasted for three days, and had to be completed by means of forceps, there was a narrow pelvis along with spasmodic contraction of the os uteri; the patient was a i.-para, 44 years of age. In No. 6 the second stage of labour lasted twenty-six hours, and delivery had to be effected by forceps; the cause of the delay was not stated, but probably it was due to rigidity of the soft parts. In No. 8 there was rigidity of the maternal parts, especially at the outlet, and the umbilical cord was twisted twice round the infant's neck and once round the left arm; the placenta was partially adherent. There was a long labour in No. 9, the cause of which was not stated; but since the mother was a i.-para it may have been due to a rigid state of the passages. In No. 16 there were grave anomalies of the bony pelvis, so that labour was much prolonged; forceps were tried without success, then craniotomy and cephalotripsy were performed, and finally, by the aid of forceps, the head was delivered, but firm traction with a lac was necessary before the trunk was extracted.

In a fifth group of cases (Nos. 3, 7, 11, 18, and 19) the delay in

labour was ascribed by the observers to the state of rigidity in which the fœtus was found. At any rate, no other cause of delay was found. Thus, No. 3 was an apparently easy forceps case, but strong pains were needed to expel the trunk, probably on account of the immobility of the limbs of the dead infant. In No. 7 the pelvis was normal, yet the head stuck at the outlet, and forceps and chloroform were needed. No. 11 was a breech presentation, and labour was delayed, so the author (Martin) says, by the rigidity of the arms. In No. 18 the head stuck at the outlet, and forceps were needed, whilst the trunk was delivered by traction, the cause of delay being rigidity of the muscles of the whole body, including those of the neck and spine. In No. 19, also, the dystocia (calling for forceps and traction) was ascribed to fœtal rigor mortis.

In two instances (Nos. 4 and 10) there were *twins;* but concerning the former case no details were forthcoming, save that the labour was at five and a half months. In No. 10, however, we are told that both twins presented by the head; labour was delayed through the head of the second twin getting caught between the thorax of the first infant and the mother's sacrum; with great difficulty the first infant (a male) was extracted by means of forceps and the crotchet; it was dead and rigid, whilst the second twin (female) was born alive.

In No. 14 the labour (at the eighth month) was complicated by *acute peritonitis* of the mother, and forceps were required, difficulty being experienced in the rotation of the head. Possibly the delay here was partly due to the rigid state of the fœtus.

Finally, in No. 13, the cause of delay and the death of the fœtus were due to *prolapse of the cord.* Forceps and traction were needed to complete the delivery. There was also a pendulous abdomen.

It will be seen, therefore, that of the twenty-five recorded cases, in nine the labour was complicated by hæmorrhage (placenta prævia in three instances, accidental hæmorrhage in five, and bleeding from a varicose vein in one); in two there was eclampsia, in five the labour was prolonged on account of rigidity of the passages, in five by the rigor mortis of the fœtus, in two cases there was a plural pregnancy, in one acute peritonitis of the mother, and in one prolapse of the cord and pendulous abdomen.

(4.) *Puerperium.*—Nothing special was commonly noted concerning the puerperium; but the labour was followed in No. 5 by slight hæmorrhage and phlebitis of the veins of the leg, in No. 7 by phlegmasia alba dolens, and in No. 17 by urticaria. Grigg (No. 5) thought that the hyperfibrination of the maternal blood, as shown by the phlebitis, might have had something to do with the fœtal rigor mortis in his own case.

Description of the Infant.

In the majority of the reported cases no information concerning

the infant was given, save that it was dead and rigid; but in certain instances some further details were forthcoming.

With regard, for instance, to *sex*, the fœtus was a male in six cases (Nos. 7, 10, 22, 23, 24, and 25), and a female in two (Nos. 14 and 17); but these numbers are far too small to allow of any generalisation. The *size* of the infant was mentioned only in five cases (Nos. 14, 16, 17, 22, and 25); it weighed 2095 grammes in No. 14, 3520 grammes in No. 16, 8¼ lbs. in No. 17, 2150 grammes in No. 22, and 1220 grammes in No. 25 (a 6½ months' fœtus); whilst the length was 55 cms. in No. 17, 46 cms. in No. 22, and 40 cms. in No. 25. The umbilical cord was twisted twice round the neck and once round the left arm in No. 8; and once round the neck and once round the left leg in No. 23.

The infant was, as has been stated, dead at birth in every case, an apparent exception being No. 22. In this instance (Dohrn's) it is true that the fœtal heart was beating at birth; but its rate was only 20 per minute, and there was no respiration, so that, if not actually dead, the infant was certainly moribund.

In all the recorded cases, with the possible exception of Nos. 1 and 22, the infant was rigid at birth. Details concerning the *distribution of the rigidity* were not always given (*e.g.*, Nos. 4, 9, 20, and 21); but in all the instances in which there was any information at all the limbs were fixed, and the fixed attitude was one of flexion. In certain cases the arms were further described as folded on the chest with the hands closed. In Nos. 5 and 25 the lower limbs were less rigid than the upper, whilst in No. 18 the reverse was the condition found. In some instances (Nos. 5, 8, 13, 15, 18, 22, 23, and 24) it was noted that the jaws were also clenched. Rigidity of the neck muscles was observed in Nos. 5, 18, and 22, whilst it was absent in Nos. 6 and 13. In a few cases the abdominal muscles and those of the back were also contracted (Nos. 6, 18, 22, and 23), whilst in No. 5 the former were described as flaccid, and in No. 13 both were so.

With regard to the *duration of the rigor mortis*, it is stated that in No. 17 it began to pass off in an hour after birth, in three hours in No. 19, and in about five hours in No. 25; but in No. 23 it was present, although less marked, twelve hours after delivery, sixteen hours later in No. 24, twenty-four in No. 22, and thirty hours after birth in No. 18.

With regard to the behaviour of the contracted muscles after forcible stretching, it was noticed in three cases (Nos. 5, 8, and 22) that the rigidity returned, whilst in six instances (Nos. 6, 14, 15, 16, 24, and 25) it did not. In No. 24, however, this phenomenon was not inquired into till sixteen hours after birth.

Doubtless the distribution of the rigidity, its duration after birth, and its return after forcible extension, all depended upon such circumstances as the length of time before birth when death occurred, the cause of death, and possibly also the condition of the

mother's blood. For instance, the cases in which it was probable that death took place very shortly before birth were the ones in which the rigidity returned after stretching. Thus in No. 5 the fœtus was supposed to have died about seven hours before birth, whilst in No. 22 the infant was not absolutely dead even at the moment of expulsion.

In five cases (Nos. 5, 15, 17, 24, and 25) the *condition of the skin* of the infant was specially noted; it was livid in Nos. 5, 15, and 17; and in Nos. 24 and 25 there was marked cyanosis of the upper part of the body. There was never macerative desquamation. There was no caput succedaneum in Nos. 2, 3, and 17; but a large one was present in Nos. 8, 10, and 16. In other cases there was no information forthcoming.

In six of the recorded observations (Nos. 2, 11, 22, 23, 24, and 25) a *post-mortem examination* of the fœtus was made. In No. 2 it was simply stated that the signs of premature respiration were found, whilst in No. 11 nothing special indicating the cause of death was discovered. The autopsy in No. 22 revealed fully atelectatic lungs, the absence of petechiæ, the presence of normal fœtal vessels, of a distended right side of the heart, and of congestion of the vessels of the neck, thorax, and abdomen; the brain and cord were not examined, and the bronchi were free from obstruction. In No. 23 there were the signs of intra-uterine asphyxia; there were ecchymoses on the lungs, pleuræ, and pericardium; some aspirated masses were found in the trachea and bronchi; the lungs were atelectatic; and the brain, liver, spleen, and kidneys were all greatly congested. In Nos. 24 and 25 the results of the post-mortem examination were practically identical with those in No. 23.

With regard to the *exact time before delivery when fœtal death took place*, observers have not, as a rule, been able to make any definite statements. Certainly in no case could it have occurred long before birth, for there was no record of even commencing maceration. In a few instances, however, some information was forthcoming. Thus in No. 13 fœtal movements were felt a quarter of an hour before delivery, and the midwife detected a weak pulsation in the prolapsed cord half an hour *ante partum;* that in this case death had occurred only a few minutes before birth was rendered the more probable for the reason that the rigor mortis was not fully developed when the infant was delivered. In Lange's case (No. 24), from the observation of the fœtal heart, it was gathered that the fœtus died between five and three and a half hours before birth, and in No. 5 the infant was certainly alive seven hours *ante partum*. In No. 6 fœtal movements had not been felt for seventy-two hours before birth and for two days in No. 25, and in both instances the rigor mortis when observed was evidently passing off, whilst in the other cases (Nos. 5, 13, and 24) it was not yet fully established. In No. 23 also, fœtal movements were felt

about eleven hours before birth, and in this instance the rigidity of the parts returned after forcible extension, showing that the rigor mortis was still in an early stage. Finally, in No. 22 the infant was moribund at birth, and, as was to be expected, the cadaveric rigidity was still present twenty-four hours later.

General Considerations.

I have in the preceding pages gathered together all the available information concerning these twenty-five reported cases of antenatal rigor mortis, and I must now consider certain questions suggested by these details:—

(1.) *What is the nature of the muscular rigidity seen in the dead fœtus?*

(2.) *Granting that it is rigor mortis, has it any characters in which it differs from rigor mortis at other ages?*

(3.) *Why has it been so rarely observed?*

(4.) *Has it any clinical significance as regards the progress of labour?*

(5.) *What are its medico-legal bearings?*

The first question is with regard to *the nature of the muscular rigidity* seen in these dead fœtuses. Was it true rigor mortis? Was it not possibly some other morbid state? Ashburton Thompson (6) seems to have been the first to regard it as doubtful that it was really cadaveric rigidity, and Bailly (10) does not appear to have been quite certain with regard to its nature; but all the other authors who saw instances of it were evidently of the opinion that it was rigor mortis in the usual acceptation of the term. Thompson was much impressed by the great rarity of the condition, and thought that if it were really cadaveric rigidity it ought to have been constantly observed. He, therefore, suggested that it might be a tetanic spasm which, occurring in *articulo mortis*, was prolonged after death. In a later communication he was disposed to admit that Grigg (5) really saw cadaveric rigidity in the case described by him, but still thought that there was at first cadaveric spasm, which after birth passed into a state of true rigor mortis. It has also been suggested that it might be due to an eclamptiform seizure, which, coming on during the life of the fœtus, was perpetuated (as rigidity) after death.

Now I think it can be proved (1) that there is nothing in the condition or environment of the fœtus *in utero* to prevent the occurrence of rigor mortis; and (2) that the details of the recorded cases agree with these of cadaveric rigidity as it occurs in childhood and adult life, and not with those of cadaveric spasm or of convulsions immediately preceding death. In order to clear up these points I must very briefly refer to the ascertained phenomena of rigor mortis in adult life.[1]

[1] For the facts to be stated below I am chiefly indebted to the able summary in Meymott Tidy's *Legal Medicine*, vol. i., p. 58 *et seq.* 1882.

Soon after death the muscles become flaccid, but are still capable of contracting under the application of stimuli (electrical, traumatic, etc.). This stage of muscular relaxation and flaccidity with contractility usually lasts for about three hours; but it may, on the one hand, continue for only a few minutes, and may even be non-existent, whilst on the other hand it may persist beyond the three hours. Immediately following this stage is the period of cadaveric rigidity or rigor mortis. It occurs always and in all animals, vertebrate and invertebrate, and it is common to the voluntary and involuntary muscles. During this stage the muscles retain the position in which they were at the moment of its supervention; and the rigidity is independent of the nervous system and of the air. It is also independent of temperature, although thermic variations may influence the time of its appearance and its duration. It is probably due to the coagulation of the myosin from the action of an acid, which has accumulated in the muscles; at the same time it must be remembered that this chemical theory of Kühne, Brücke, and others has not been accepted by some (e.g., *Nysten and Brown-Séquard), who regard rigor mortis as a last contraction of the muscle, a physiological phenomenon, and the recent researches of Tissot* (26) (*to be referred to later*) *seem to lend some support to this view.*

It usually makes its appearance in the voluntary muscles about three or four hours after death, and it requires one to two hours to become fully established. Its supervention may, however, be delayed, as in cases of sudden death in strong individuals (e.g., *by decapitation or asphyxia*), *and in bodies exposed to a low temperature. It may, on the other hand, come on very rapidly even before the heart has ceased to beat, and whilst the body is still warm. The rigidity which sets in immediately after death has been regarded by Ogston, Taylor, and others as a different thing from rigor mortis, and has been called "cadaveric spasm," "instantaneous rigor," and "tetanic rigidity;" but Meymott Tidy is of opinion that no such distinction can physiologically be made. The rapid appearance of rigor mortis is usually seen in cases in which death has been preceded by great exhaustion, as after convulsions or other forms of excessive muscular action. The rigidity does not affect all parts of the body at once: it begins in the eyelids, spreads to the muscles of the jaws and face, and then attacks those of the lower and upper limbs. It disappears in the same order.*

In its duration rigor mortis varies greatly: the limits have been given as sixteen hours and forty-eight hours, but it may pass off so quickly that it has escaped notice, whilst it may remain even longer than forty-eight hours. Its appearance and duration are influenced by age, temperature, mode of death, etc. Thus in infants it is said to set in rapidly and pass off soon; the same rapid appearance and disappearance occur after a long illness, and in cases of violent death after muscular exhaustion; its supervention is delayed, and its continuance prolonged by cold and a dry temperature, but it is also well marked in a warm and fluid medium (Brown-Séquard and Nider-

korn); and the greater the muscular development and the smaller the amount of ante-mortem fatigue, the longer the rigidity will last. Finally, when a joint stiff with rigor mortis is forcibly bent, the stiffness does not return if the rigidity has been fully established, whilst it does to some extent do so if the rigor has not been complete.

From what has been said it will be evident that there is nothing in the fœtal state or environment to prevent the occurrence of rigor mortis *in utero*. It has not been shown that the muscles of the fœtus differ from those of the adult,—they are, it is true, softer and less capable of severe and prolonged exertion; but these slight differences would only tend to make rigor mortis appear quickly and pass off soon; and this exactly coincides with clinical experience, for it is known that in young infants these are the very characters of the cadaveric rigidity. Further, the fact that the fœtus is surrounded by liquor amnii is no obstacle to the belief above stated, for the corpses of the drowned show rigor mortis, and this phenomenon has also been seen in still-born infants when in a bath. The high intra-uterine temperature, also, cannot prevent the supervention of the rigidity, for it has been seen in animals placed in stoves in which the thermometer indicated more than 38° C. (Dagincourt). It may be urged, however, that rigor mortis has developed in the fœtus before the rupture of the membranes (as in No. 12, in which Cæsarean section was performed), and therefore without the presence of atmospheric air; but, as has been stated above, rigor mortis may appear even when air is absent. It is, therefore, evident that there is nothing in the condition or environment of the fœtus to prevent the occurrence of rigor mortis.

It must also, I think, be admitted that in its characters fœtal rigor mortis resembles almost perfectly that state as seen in the adult, allowance being made for the fact that the exact moment of the appearance of the rigidity could not, from the circumstances of the case, be ascertained. Thus, in all the records it was stated that the fœtus was fixed in an attitude of flexion, *i.e.*, in the resting attitude of fœtal life, and the one in which death would surprise the infant. Cases have been reported in which the limbs were found at birth to be rigidly *extended;* but in these instances, as, for example, in the one reported by Ribemont-Dessaignes,[1] the infant was born *alive* with the extremities rigid, and, therefore, they do not come into the category of rigor *mortis*. Again, in none of the recorded cases did the cadaveric rigidity present phenomena essentially different from those seen at other ages. It is true that there were marked variations in the distribution of the rigidity, in the time for which it persisted after birth, and in the effect produced upon the rigidly flexed limbs by forcible extension; but if it be borne in mind that the time *ante partum* when the fœtus died probably varied in all these cases, the differences above mentioned

[1] Ribemont-Dessaignes, A., "Note sur un cas de contracture chez un enfant," *Annales de Gynécologie*, xxvii. p. 257. 1887.

are all capable of explanation. Further, it is known that in the instances in which death certainly occurred only a short time (few hours) before birth (*e.g.*, Nos. 5, 8, 23, and 24) the rigor mortis had a widespread distribution, returned after forcible stretching, and persisted for a considerable time; whilst in the instances in which it was probable that the fœtus had died a good many hours before its delivery the rigidity was confined to the limbs, did not return after forcible extension, and did not last long. The presence or absence of the caput succedaneum may serve to denote whether death occurred a short or a long time before birth, and it is noteworthy that in No. 17, in which there was no caput, the rigidity passed off in one hour; whilst in No. 8, a case in which death could not have occurred long before delivery,—in which, in fact, the infant was doubtless alive during labour,—there was a large caput succedaneum. It may be urged that there is evidence to show that in some instances the rigor mortis must have come on immediately after death, even whilst the fœtus was still alive, although moribund (*e.g.*, No. 22); but the same phenomenon has been met with in the adult, and, although it has been called by the special name of "cadaveric spasm," there is no evidence to show that it differs in any essential particular from rigor mortis.

Of course, the time at which death occurred *ante partum* is only one possible cause of differences in the distribution and persistence of the rigor mortis. With regard to others, the influence of heat and cold may, I think, be neglected, for the interior of the uterus may be regarded as having a practically constant temperature; but the kind of death must be looked upon as a very important factor. In some cases there is no doubt that the fœtus died of asphyxia, the mode of death which in the adult is followed by the delayed occurrence of rigor mortis; but in these instances the fœtus may have had convulsions *in utero* (in fact, violent fœtal movements preceding death were observed by the mother in some cases), and these may, by exhausting the muscles, have induced an earlier supervention of rigidity than the mode of death would seem to permit. On the whole, therefore, it cannot be said to have been proved that there were in any of the recorded cases phenomena which could not be explained on the supposition that the rigidity was of the nature of rigor mortis.

The second question (*Does fœtal rigor mortis differ in any essential characters from adult cadaveric rigidity?*) has been almost entirely answered in the above paragraphs. It is, I think, evident that rigor mortis in the fœtus is governed by the same laws as in the adult. It may be that, as a rule, it comes on earlier after death and passes off sooner than at other ages; but this is quite in keeping with what is known of rigor mortis in young children, and is to be explained by the fact that the muscles in early life are not so capable of prolonged action as at other ages.

So far I have endeavoured to answer the two questions stated

above solely from evidence afforded by the human fœtus; but quite recently Tissot (26) has made some experiments on the excitability of muscles in a state of cadaveric rigidity, in the course of which he was able to demonstrate the existence of rigor mortis in fœtal kittens. Tissot makes the statement that, contrary to the generally received opinion, the fœtus becomes rigid as well as the adult, and then describes the following experiment:—On 17th March 1894 a pregnant cat was killed at 1 P.M., and immediately five fœtuses in the intact amniotic sac were removed and put in a cool place; at 4.50 P.M. electrical excitability had disappeared in all the fœtuses; at 8 P.M. there was not one that showed rigidity, but they all did so the next day at 9 A.M.; and excitability to mechanical stimula disappeared at varying times,—in three it persisted till the 19th March at 10 A.M., in two till the 20th March at 2 P.M., and in two others till the second day of the persistence of the rigor mortis. Tissot goes on to say: "This experiment shows that the fœtus becomes rigid, and I will say that I have never seen one that did not become so, although it has always been denied that the fœtus has this property. This rigidity is certainly not as intense as in the adult, but it is very distinct, and is as intense as it can be in animals whose muscles are still little developed and whose skeleton is soft. The limbs have a fixed position and a marked stiffness. If they are displaced from their position, they return to it instantly like a spring. The fœtus becomes equally rigid, and that much more quickly when it is left in the body of the mother after death, and in this case the mechanical excitability disappeared rapidly, but I have always seen it persist for several hours in the rigid animal." Whilst several interesting facts may be learned from Tissot's experiments, two are of especial importance from the standpoint of this paper:—These are—(1), The indubitable proof that rigor mortis occurs in the dead fœtus in the case of the lower animals; and (2), the more rapid supervention of this rigidity when the fœtus is allowed to remain in the abdomen of the mother. I do not see that there is any reason why we should not regard these statements as applicable to the human fœtus.

The third question (*Why is rigor mortis in the fœtus so seldom observed?*) is not easy to answer; but the following possible explanations may be advanced:—In the first place, it may be granted that in the very cases in which fœtal rigor mortis is most likely to be manifest at or soon after birth (viz., the cases in which the fœtus dies during labour), the obstetrician is so absorbed in his anxiety for and care of the mother that he pays but scant attention to the new-born infant. In the second place, it is reasonable to suppose that in some cases of intra-uterine death rigor mortis has passed off before the expulsion of the infant, whilst in others the birth may so rapidly follow the death that the rigidity has not had time to develope, but appears later when attention is no longer

directed to it. Possibly the existence of rigor mortis just at the time of birth requires such a concatenation of circumstances as seldom exists. In the third place, it may be that the characters of fœtal rigor mortis are such as to render it difficult of observation, for it would seem that it is less marked than in the adult; and Tissot's experiments have shown that in the fœtal kitten, at any rate, it comes on much more quickly when the animal is allowed to remain in the abdomen of the mother. It may well be that this law holds good also of the human fœtus, and that in it rigor mortis, along with its slightly marked character and rapid supervention, has also the property of disappearing early. It is, at any rate, noteworthy that in the case in which it lasted longest it was not yet fully developed when the fœtus was expelled from the maternal passages. In the fourth place, I would hazard the suggestion that in the case of still-born infants who are not resuscitated although attempts to restore them are made, the non-appearance of rigor mortis may be due to the forced movements effected in the carrying out of artificial respiration, which by exhausting the muscles make the rigidity so slight as to be almost non-existent.

The fourth question—that which has to do with *the clinical importance* of fœtal rigor mortis—may be answered in a few words. Although Dagincourt (14, 15, 16), writing in 1880, was of opinion that its existence did not render the extraction of the fœtus difficult nor delay the labour, yet the observations of Boxall (17), Jones (18), Davidson (19), and others prove that it may do so. It is, indeed, quite rational to believe that the rigidity of the fœtus will, by its interference with pelottonnement and the movements of flexion and rotation, so disturb the whole mechanism of labour as both to delay it and to render it dangerous.

The fifth question (*What are the medico-legal bearings of fœtal rigor mortis?*) is a very important one. It must now be admitted by medical jurists that rigor mortis may and does occur before the expulsion of the fœtus from the uterus, and that, therefore, its presence in a new-born infant is not necessarily a proof of life apart from the mother,—of, in fact, an independent existence. All that it, of itself, can prove is that the fœtus was alive shortly before or at birth. This fact must be borne in mind in cases in which a woman is accused of infanticide. The presence of rigor mortis, in the absence of the other changes indicative of live birth, does not suffice to show that the infant was born alive in the legal sense of the term.

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MEETING III.—JANUARY 9, 1895.

Dr A. H. FREELAND BARBOUR, *President, in the Chair.*

I. *The President* showed a SUPPURATING DERMOID OVARIAN CYST, which from pressure on the right ureter had caused hydronephrosis.

II. ON A CASE WITH SYMPTOMS SIMULATING HYSTERIA IN PREGNANCY, GOING ON TO APPARENT DEMENTIA; DEATH SHORTLY AFTER DELIVERY; BRAIN-LESION FOUND ON *POST-MORTEM*. CHILD STILL-BORN, WITH CONTRACTURES.

By A. H. F. BARBOUR, M.D, etc.

IT is not uncommon to find symptoms of hysteria of a minor form complicating pregnancy and labour. The connexion between the generative organs and the nervous system is so intimate that functional disturbances of the latter in pregnancy are frequent. It is important, however, to remember that such disturbances as we commonly associate with hysteria may be the early symptoms of a grave nervous lesion, as the following case shows.

The patient was a young primipara, aged 20, a biscuit-factory girl, who at the date of delivery was rather more than eight months pregnant. Father and mother were healthy; there was no history of fits in the family, but the mother is most emotional. She has had six sisters, all of whom died young. There is no history of syphilis in the family. The patient was strong and healthy up till the date of stirrage in December 1893. At this time she became melancholic, as she could not conceal her condition, and this state of mind was aggravated by her treatment at home. Towards the end of January she became very fretful and peevish, and on February 13th (in the seventh month of her pregnancy) took what resembled a shock of paralysis—she suddenly staggered, lost vision and also the power of the left leg—but quite recovered in a few minutes. A fortnight later a similar attack occurred, beginning with emotional disturbance, tremors, and faintness, and leaving loss of power in the left arm, and aphonia. Next day six of these fits occurred, but always between them there was recovery of speech and muscular power.

She was admitted to the Maternity Hospital on February 28th, trembling, pale and emotional, with what seemed paralysis of left side and face, left arm and leg; marked aphasia, partial aphonia; tongue mesial. There was partial loss of power in the left hand, but no further paralysis could be made out. The reflexes of the knees were very much increased, especially the left; but there was no increase of the reflexes in the upper limbs. There was marked

increase of plantar and abdominal reflexes, particularly of left plantar. She complained of no eye symptoms, but the reaction of the left pupil to light was diminished. After being in the hospital for four-and-twenty hours, she was discharged apparently quite well, and walked to Portobello.

On March 28th another attack came on, with emotional beginning, then loss of speech, and, finally, general paralysis,—followed soon by contracture of the right arm. There was no loss of consciousness. At this time I had her for several days under observation in a room near the Maternity Hospital, as, being still a month short of full time, and not in labour, she could not be admitted. She lay on a couch, and was apparently generally paralysed, although at times she moved the paralysed limbs coördinately. She passed urine and fæces involuntarily; there was great difficulty in swallowing, the soft palate being completely paralysed.

On March 29th there was ptosis of right eyelid, contracture of right biceps, firm right-elbow flexure, and commencing rigidity of both lower limbs equally. The superficial and deep reflexes were markedly increased in both lower limbs, especially the left.

Her face had the appearance of an imbecile; and it was difficult to say whether it was a case of hysteria during pregnancy, which might pass off after delivery, or one of dementia, of which the hysterical symptoms were premonitory. It was evident that she must either be taken into the Maternity Hospital with the view of having labour induced, or removed to the Asylum. After consultation with the parochial medical officers, it seemed better to give the patient the benefit of the doubt, and treat it as a case of hysteria which might be relieved by inducing labour, and she was admitted to the Maternity. To the Resident Physician, Dr Eddington, I am indebted for further notes of the case.

On April 3rd she began to show partial analgesia and very marked partial anæsthesia of both lower limbs, the degree and area varying constantly. The contracture of the right biceps and the rigidity of the lower limbs continued till her death. The plantar reflexes were much increased, especially the left; and both knee reflexes also, especially the left; those of upper limbs not increased. There were marked fugitive flushings, sweating and pallor, but no wasting; temperature and pulse normal.

The question of induction of labour was solved by labour coming on spontaneously on April 4th. The child was L.O.A. and alive when labour began. At the onset of labour the temperature rose to 102°·6, and the pulse to 130. She took minor epileptiform spasms with every pain, the eyes being fixed, mouth frothing, some cyanosis, breathing stertorous, the limbs fixed in three-quarters flexion, with a curious twisting of the right wrist. Pupils became inactive, except a slight reaction of the left to light. After two and a half hours she had a more severe fit, during

which the membranes ruptured. After this fœtal movements stopped and the heart was not heard, the child apparently dying about this time. During the next hour and a half she had several fits, and, her pulse failing, delivery was effected immediately by forceps. Under repeated doses of ether the pulse improved. The temperature, which was at its maximum when the membranes broke, became normal. All paralysis disappeared, but sensation was impaired as before, and the contracture of the right arm persisted. During the next thirty-six hours she was able to take nourishment, and slept well, and looked as if she would recover; but on the evening of the 6th, pulse and temperature again rose steadily; there was entire abolition of all the reflexes except the plantar; there was no rigidity of the limbs, and the contracture of the right arm disappeared. The temperature rose to 105°, and the pulse flickered out.

The following is Dr Muir's report of the post-mortem:—

"There was no evidence of syphilis in any of the organs. The kidneys showed commencing cortical milliary abscesses, beyond which there was nothing worthy of note except in the brain. There was general thickening with opalescence of the pia-arachnoid over the hemispheres, especially at the vertex, and a similar marked thickening of the membranes at the base of the brain. This was specially marked around the arteries and along the Sylvian fissure. The arteries showed local patches of thickening. The basilar was markedly affected in its course over the pons, and in its middle third was thrombosed, the thrombus being firm and apparently of some duration. There were also patches of thickening in both middle cerebrals.

"On cutting into the brain an area of softening was found on the right side, involving part of the head of the caudate nucleus and the anterior limb of the internal capsule. This softening extended to the base of the brain, where it became more extensive, involving the convolutions of the Island of Reil and adjacent part of the inner aspect of the temporo-sphenoidal lobe. The affected brain tissue was somewhat pulpy, and the softening was apparently comparatively recent (of a few weeks' duration). On dissecting out the branches of the right middle cerebral, many of them are found to be thrombosed, with thickened walls (though the main trunk was free), and the softening was the result of this. The cortical grey matter of the hemispheres was somewhat atrophied, but otherwise appeared normal. In the pons, at the level of the thrombus in the basilar artery, an area of softening was found about the middle, extending more to the left side, measuring about three-quarters of an inch in diameter. This softening was apparently pretty recent.

"Microscopic sections at various parts of the cortex showed a good deal of pigmentary degeneration, most marked in the

pyramidal cells of the Rolandic areas, though analogous changes were found in the occipital and parietal lobes. The walls of the capillaries showed a multiplication of nuclei in and around them, and also a good deal of pigment. The thickened arteries examined showed marked endo-arteritis obliterans, usually asymmetrical, with patches of peri-arteritis. The thrombus in the basilar was well organised, containing an abundance of small vessels,—the organised portion almost completely filling the lumen, but leaving a small channel, which was filled with more recent clot.

"Sections were also made of the pons and medulla, and stained both by ordinary methods and by the Weigert-Pal method. These sections showed the area of softening in the pons already mentioned, which involved the posterior of the vertical fibres more than the anterior, and also some small outlying foci of softening. There were the usual appearances in the parts affected,—broken-down myelin, compound granular corpuscles, leucocytes, etc., and at the periphery there was a pretty well marked zone of abundant young capillaries. Sections of the parts beyond showed no secondary degenerations,—the medulla, for example, being quite healthy. This softening in the pons may have corresponded to the more recent attack, for, though the endo-arteritis in the basilar was of much longer duration, the actual closure of the nutrient vessels coming off from it may not have taken place till a comparatively recent period. To judge from the naked-eye appearances the softening in the right hemisphere was the older of the two, though microscopic sections were not made. In connexion with both softenings one would expect symptoms produced by disturbance in the circulation in the parts around of a more or less temporary character, whilst, of course, the effects of the actual destruction of the conducting fibres would be permanent. From the position of the softening in the pons, comparatively few of the motor fibres would be actually destroyed.

"The condition of the brain cortex and its membranes resembles that usually associated with an impaired mental condition—more or less dementia."

Another feature of interest in this case lies in the fœtus. It died during labour and was delivered with forceps. It showed contractures of all the limbs, which will be best understood by looking at the Photograph taken eighteen hours after birth. The lower limbs were slightly flexed at the knee; the upper limbs were both flexed at the elbow, the right most markedly; the right hand was further flexed at the wrist; the middle finger and thumb of the right hand were flexed on the palm, and all the fingers of the left. The curious feature in the case is that the fœtus showed almost exactly the same contractures that the mother exhibited, down to the peculiar attitude of the right arm. These contractures could not be due to *rigor mortis*, the occurrence of which in the fœtus Dr Ballantyne discussed in such an interesting way at our last

meeting. They were present eighteen hours after death, as the Photograph shows, and persisted until the fœtus was put in spirit

two days later. Dr Walker dissected the arms, and found that the contracture was due to muscular action.

I regret very much that the brain of the fœtus was not examined whilst it was fresh, so as to determine whether the same condition was present in it as in the mother.

Dr J. W. Ballantyne agreed with Dr Barbour in thinking that the contraction of the limbs in the fœtus in the case so interestingly related by him was not of the nature of rigor mortis. He thought the case resembled rather some of those put on record by the older writers under the name of "Catalepsy in Mother and Fœtus"; and he had seen in the *Annales de Gynécologie* for 1887 the notice of a fœtus born alive with contractures of the limbs not unlike those of the specimen seen by Dr Barbour. It was matter for regret that neither the brain nor spinal cord of the fœtus were available for examination, as some lesion of these parts might have been the cause of the contractures. In a note by Dr William

Osler in the current number of *Teratologia*, there was the record of a fœtus removed from the mother's uterus after her death, in which there was a cerebral hæmorrhage; and in a case which had recently come under his own notice, nearly the whole of one cerebral hemisphere was destroyed by an old hæmorrhage in a fœtus with general dropsy.

III. THE CLINICAL ASPECTS OF UTERO-SACRAL CELLULITIS.

By William Fordyce, M.D.

Mr President and Gentlemen,—Inflammation of the cellular tissue between the folds of the utero-sacral ligaments, with the pathological anteflexion of the uterus which results from it when the inflammatory exudation has gone on to the stage of cicatrization, is so frequently met with in gynæcological practice, the disease itself is so intractable, and so much irrational and injurious treatment has at different times been introduced in connexion with it, that I feel no apology is needed for bringing the subject before you to-night. I am aware that the tendency of modern gynæcology is to minimise the importance of cellular and peritoneal inflammations in the pelvis and of those displacements of the uterus which result from them, and to look for diseased conditions of the tubes and ovaries in explanation of the symptoms we find accompanying them; but I wish to-night to put in a plea for utero-sacral cellulitis as a definite disease of very frequent occurrence, and unaccompanied, in by far the greater number of the cases, by any pathological condition of the tubes and ovaries,—a disease whose symptoms are pretty constant and definite, and the treatment of which, though perhaps not so immediate in its results as we could wish, since it does not lend itself to surgical interference, is yet in many cases satisfactory and beneficial.

At the outset, let me state that this paper does not pretend to be at all exhaustive. The literature of the subject is so extensive that any adequate reference to it would be impossible within the limits of a short paper. I have, therefore, confined myself to an account of the disease as it has come under my own observation during the past six years in dispensary and hospital practice.

Utero-sacral cellulitis is, in my experience, by far the commonest cause of that degree of anteflexion of the uterus which we call pathological, and is met with both in nulliparous and parous patients; although it is found more frequently among those who have borne children, and its causes are generally puerperal in origin. Very often we can get a distinct history of an inflammatory attack following labour or abortion, but not always; for the inflammation of the cellular tissue, due, in all probability,

to a septic infection from a torn cervix or perinæum, may, from the first, be of a low and chronic form—the *parametritis chronica atrophicans* of Freund; or the acute stage may be so short that the local phenomena may escape even the patient's notice. The causes of the lesion in nulliparous and unmarried women are more obscure.

Constipation, infection of the cellular tissue from fissures in the rectum, and the spread of inflammation from the cervix or endometrium, are possible causes in these cases. It may be that the thickening and shortening of the ligaments in some of these cases are not due to inflammatory cicatrization, but may be congenital, and occur along with, but not cause, the accompanying pathological anteflexion.

I wish, however, to refer chiefly to the clinical aspects of the disease as it occurs among those who have borne children. What are its symptoms? What explanation is to be offered of those symptoms in order to get a rational basis for our treatment? How may the condition be diagnosed, and what is the best treatment to adopt?

First.—What are the symptoms?

These, I believe, are peculiarly definite and constant in well-marked cases; and in illustration I cite briefly the three following cases taken from the records of the Women's Dispensary, Canongate, and the gynæcological clinique in the Cowgate Dispensary, where during the past years, as assistant to Dr Barbour, I have had the opportunity of observing a large number of cases.

CASE I.—Mrs B., æt. 34, came complaining of pain in the back; severe pain at her monthly periods, the pain being most marked during the flow. She has had one child, ten years ago, when she was 25 years old, and has never been free from pain since. After the birth of the child she was confined to bed for seven weeks owing to what she described as "inflammation." She has had no abortions. Menstruation is regular every four weeks, but the discharge is very scanty, and is accompanied by great pain. Formerly, she was poorly from four to six days, and had little pain; now she is poorly only two days. She suffers great pain on sexual intercourse. There is no special complaint about any interference with micturition; but a year ago, for several months, patient states she was troubled with her water, and had to pass it very frequently.

On vaginal examination the cervix is found dragged upwards and fixed posteriorly. Any attempt to push the cervix into its normal position is accompanied by great pain. The body of the uterus is acutely anteflexed. Diagnosis:—Utero-sacral cellulitis and pathological anteflexion of the uterus.

CASE II.—Mrs M., æt. 26, came complaining of pain in the back and sides, and pain at her monthly periods. The pain in the back

began after the birth of her child eight years ago, and has continued with varying severity ever since. She was confined to bed for three weeks after her labour, during which time she was feverish and suffered from severe pain in the lower part of the abdomen.

Menstruation is regular, duration two days; but the amount of blood lost is very small, and while she is unwell she suffers severe pain. Before the birth of her child menstruation was more profuse and almost painless.

On vaginal examination the cervix is found directed forwards and fixed posteriorly; and on pressing it forwards the patient complains of great pain, and the tense utero-sacral ligaments can be felt thickened and very tender.

On bi-manual examination, the body of the uterus is found retroposed and acutely anteflexed.

Diagnosis:—As before.

CASE III.—Mrs B., æt. 27, came complaining of dragging pain and weakness in the back, and pain at her monthly periods since the birth of her only child two years ago. Menstruation regular; but whereas it formerly lasted seven days and was almost painless, it now lasts only one day, and the pain is so severe that she is often unable to attend to her household duties. She complains also of irritability of bladder and pain on defæcation.

The physical signs, on vaginal examination, are those of utero-sacral cellulitis and marked anteflexion of the uterus.

These are, I consider, typical histories of cases of utero-sacral cellulitis as the disease is met with among parous patients; and the symptoms are, I believe, pretty constant and definite in well-marked cases when the disease is not complicated with other pathological lesions in the pelvis.

Dealing with these symptoms *seriatim*, we find—(1*st*), *Pain*, chiefly in the back. The pain is described sometimes as "dragging" in character, sometimes as "aching," more rarely as "down-bearing," and not infrequently as a "weakness" or "soreness." Very often the pain in the back is accompanied by pain in the iliac regions, but this is generally less marked than the sacral pain. The pain is always worse after exertion, and relieved by rest.

(2*nd*), *Dysmenorrhœa.*—This is always a very prominent and perhaps the most troublesome symptom. One of the worst cases of dysmenorrhœa that have come under my notice occurred in a married woman who had borne two children, and in whom there was well-marked utero-sacral cellulitis and anteflexion of the uterus. The pain is almost invariably most marked *during* the flow, and is in inverse ratio to the amount of blood lost. In parous patients it will be found that the dysmenorrhœa has been either acquired, or at any rate very much aggravated during the patient's illness.

(*3rd*), The *Duration of the Menstrual Flow* is diminished from a normal period of four to six days to two days, or even to one day. This diminution is gradual, and seems to progress with the disease; and, what is most marked, the gradual diminution in the amount of the discharge is accompanied by a corresponding increase in the amount of the pain.

The acquired dysmenorrhœa and gradual diminution of the amount of blood lost I consider two of the most important and constant symptoms of the disease.

(*4th*), *Sterility*, relative or absolute.—In the three cases I have quoted, the patients had all borne children, but had been sterile for periods varying from fifteen to two years. Acute anteflexion of the uterus, with or without parametritis posterior, is, in my opinion, by far the commonest cause of sterility.

(*5th*), *Vesical Troubles.*—Frequency of micturition is often a troublesome symptom, and generally occurs at some stage of the disease. Pain during the act is also often complained of. Though bladder symptoms are less constant than the others, they will, I think, be found in the majority of cases.

(*6th*), *Dyspareunia*, though naturally not always complained of at first, is invariably present; and not infrequently I have found that it was for this that patients have been finally forced to put themselves under treatment.

(*7th*), *Pain on Defœcation* is a troublesome symptom in cases where constipation is also present.

Very frequently, as in the three cases I have quoted, we get a definite history of an acute inflammatory attack occurring during the last puerperium or coming on after an abortion. This is not invariable, however; for, as Schultze pointed out, the acute stage of parametritis is often very short, and the local phenomena slight,—the slight rise in temperature, which may be its only manifestation, being attributed to some disturbance in connexion with lactation.

The more remote reflex phenomena—such as gastric disorders, hysteria, and neuralgias—which are so frequently found associated with chronic uterine disorders, and whose symptoms often mask and outweigh those of the local disease, I have not observed to occur more frequently in connexion with utero-sacral cellulitis than other chronic diseases of the pelvic viscera. This has, however, been noted by other observers; and if we believe at all in uterine reflexes—as I think we must—we should expect that these phenomena would find a prominent place in connexion with the disease under notice, seeing that the physiological functions of menstruation and reproduction are so markedly affected. The class of cases, however, which has come under my notice in dispensary practice does not offer a fair field for the observation of such neuroses; and some other members of the Society may be able to speak more confidently on this point.

The parts played by the primary parametritis on the one hand,

and the secondary displacement of the uterus on the other, in producing the symptoms I have enumerated, and the explanation of some of these symptoms, open up a wide field for discussion. Some of the symptoms—such as pain in the back, dyspareunia, and pain on defæcation—need hardly be referred to in this connexion. Their explanation is self-evident.

It is different, however, with the dysmenorrhœa, the sterility, and the bladder troubles. As regards the causation of these symptoms much has from time to time been written.

As regards the *Dysmenorrhœa.*—Schroeder's theory was that the blood is poured out within the cavity of the uterus, but can only escape with difficulty because of the flexion at the internal os. This is the old obstruction theory of dysmenorrhœa, and, I believe, may account for some cases, especially in nulliparæ where the passages have not been dilated by the process of parturition. I have got, in two cases, excellent results from dilatation of the cervical canal and internal os in anteflexed uteri; and if the dysmenorrhœa in these cases was due to chronic metritis, I cannot see how the cures were effected. One would expect to find, on the latter assumption, that harm instead of good was done. In by far the greater number of cases, however, we must seek for the explanation of the dysmenorrhœa, not in any obstruction due to the anteflexed condition of the uterus, but to the metritis which so frequently, if not invariably, is found associated with the anteflexion. The rigid fibres of a chronically inflamed uterus do not so readily accommodate themselves to the congestion of menstruation; and as, moreover, it is now generally admitted that the muscle fibres of the uterus undergo contraction at a menstrual period, it is not difficult to understand why the contraction of these inflamed muscle fibres should be accompanied by severe pain. I do not, however, agree with Schultze when, in disproof of the obstruction theory of dysmenorrhœa, he says,—"The pains which have to be explained begin, as a rule, before the commencement of the discharge of blood; often a long time before it." In my experience, the pain is most marked *during* the flow; and the premenstrual pain does not at all compare with it in severity.

I can only explain the scanty menstruation, which I believe to be a marked feature of the disease, on the supposition that the chronic metritis is accompanied by some fibrous or atrophic change in the endometrium, by which it is rendered less vascular or less liable to disintegrate at a menstrual period.

The *sterility*, in the majority of cases, I should explain in the same way, viz., by some change in the endometrium, which on this account does not form a suitable *nidus* for the fertilized ovum. In some cases, doubtless, an accompanying peritonitis may have interfered with the functions of the tubes and ovaries; but, as I stated before, in the majority of cases of utero-sacral cellulitis the tubes and ovaries are not affected.

That the flexion may in some cases interfere with the passage of the male fertilizing elements, as it does in some rare cases offer an obstruction to the discharge of the menstrual blood, I feel disposed to admit, and for the same reason. Three years ago I operated on a woman for the relief of severe dysmenorrhœa and leucorrhœa, and removed three small mucous polypi from the cervical canal with excellent results. The dysmenorrhœa and leucorrhœa at once disappeared; and the patient, though 42 years of age and sterile for fourteen years, gave birth about a year afterwards to a healthy child. If a group of mucous polypi could prevent conception, I do not see how an acutely anteflexed uterus may not in some cases act similarly.

The *vesical troubles* may be explained by the dragging on the base of the bladder produced by the posterior fixation of the cervix, with which it is intimately connected. This is a more rational explanation than the pressure of the anteflexed fundus on the upper wall of the bladder; because the uterus rests on the bladder even in its normal position in the pelvis.

The *diagnosis* of utero-sacral cellulitis may be dismissed in a few words. As a rule no difficulties present themselves.

The cervix is felt high up and fixed posteriorly. Its normal mobility is lost. In marked cases it is generally directed forward; any attempt to bring it into its normal position causes severe pain, and, at the same time, the tense thickened folds of the ligaments can be felt passing backwards towards the sacrum. The body of the uterus, sharply flexed on the cervix, can be felt through the anterior fornix, especially when the bladder is empty.

Not unfrequently it is very difficult to examine the uterus bi-manually on account of the retroposition of that organ as a whole, resulting from the contraction of the utero-sacral ligaments.

In nulliparous patients this difficulty is most likely to be met with where, on account of the tense abdominal walls, we may not be able to reach the displaced fundus; and a wrong diagnosis of retroversion, founded on the direction of the cervix and the absence of the fundus from its normal situation, may be made. In these cases the rectal examination is of the greatest value in determining the exact situation and direction of the body of the uterus.

The *treatment* of utero-sacral cellulitis requires much patience and perseverance on the part both of the patient and of the medical attendant.

The first point I insist upon is strict attention to the bowels. The passage of large hard fæcal scybala through the rectum between the utero-sacral folds must not only strain these ligaments, but, from the irritation which is produced, tend to keep up the inflammation and lead to fresh exacerbations of the disease. For regulating the bowels I find nothing better than a teaspoonful of Epsom salts dissolved in a tumbler of cold water the first thing

each morning before breakfast. This treatment has the further advantage of being cheap; and I find patients will continue taking this when they will object to other more nauseous drugs.

The second point is bodily rest as far as possible, and sexual rest absolutely. Bodily exertion, such as much walking, always increases the pain and aggravates the disease. Sexual intercourse must be absolutely refrained from while the patient is under treatment.

In the third place, hot douching should be practised night and morning; and, if it can be carried out, ichthyol plugging. Warm hip-baths are also to be recommended.

Internally, I am in the habit of prescribing a saline mixture or potassium iodide. I do not think, however, the general treatment has much effect on the local condition.

If treatment is carried out patiently and regularly by the patient on these lines, much good can be done. When the inflammation has subsided I should not hesitate to dilate the cervix and internal os by passing bougies into the uterus. I have used electricity in the treatment of utero-sacral cellulitis with a view to absorption of the inflammatory exudation, but I cannot say that the results were encouraging. Of massage, much advocated by some and deprecated by others, I have no personal experience. I saw it regularly carried out in Germany, and the results were said to be good. Pessaries for remedying the anteflexion I have never employed, believing now, as I was taught, that they can do no good in remedying the displacement, while they may do much harm in aggravating the inflammation posteriorly.

Professor Simpson agreed with the President in regarding the communication of Dr Fordyce as one of great value and practical interest. The condition to which he had called attention in his able paper was so extremely common that it was important to have such light thrown upon it as had been done by his observations. The cases recorded were interesting, but they were all cases of women in whom the mischief had come on after a labour, whilst some of the most difficult cases occurred in women who came to consult the practitioner because they had been married for some time without ever conceiving. In such patients we find the physical conditions described by Dr Fordyce, and yet they might be unable to give us any clue from their own remembrance to the origin of the mischief. In a woman, *e.g.*, who was seen two days ago at the Infirmary, she stated that she had never had any illness before marriage; but her mother, who was called in, gave a history of pelvic inflammation in her childhood. They sometimes have had diarrhœa, or dysentery, or other affection of the bowels, which has set up the cellulitic process, overlooked at the time in the patient's other trouble. These nulliparous women were as likely to have the uncomplicated cellulitis with its consequences as the

multiparæ. He (Prof. S.) would like to say, further, that he doubted whether the symptoms categorised by Dr Fordyce could be regarded as so distinctive of the condition as Dr Fordyce seemed to think; such a train of symptoms as he had described might be found associated with other pelvic disturbance, so that with regard to this, as with regard to other pelvic lesions, it was only the direct bi-manual examination that could determine the diagnosis. Moreover, he (Prof. S.) believed that the utero-sacral cellulitis that was followed by pathological anteflexion and inflammation of the uterus was very apt to be attended also with inflammatory action in the tubes and ovaries. Dr Fordyce's observations as to the treatment were eminently judicious, and it was easy to believe in the success that had attended his management of the cases he had related. The treatment proposed by Dr Marion Sims, of division of the posterior lip of the cervix and dilatation of the os internum, had sometimes been followed with excellent results.

Dr J. W. Ballantyne did not think that Dr Fordyce, in his most interesting paper, intended in any way to minimise the importance of the physical examination (vaginal and bi-manual); but he was of opinion that gynæcologists were at the present time somewhat apt to regard the examination as everything in making a diagnosis, and to neglect the symptomatology. The latter was certainly second in importance to the physical examination; but whilst it was *second*, it was at the same time *important* also. He agreed with Dr Fordyce as to the line of treatment to be followed in those cases, and was able to report satisfactory results in the instances in which the patients faithfully followed out instructions and came regularly for the vaginal packing. Certainly ichthyol seemed to have a more rapidly beneficial result than glycerine for the tampons. He thought the Society was indebted to Dr Fordyce for bringing up the subject, and hoped that he would before long bring before them another paper dealing with some of the other gynæcological entities from the symptomatological standpoint.

Dr J. Ritchie said that the effects of an uncured gonorrhœa in the husband were sometimes manifested only after confinement; and although they might be expected to be most marked in the tubes and ovaries, they were sometimes more extended. He asked if it were known whether there had been any bladder symptoms early in the history of these cases, or any symptom pointing to a cause such as he had indicated?

Dr Church thought that constipation might as often be the result as the cause of parametric diseases. For as fissure or ulcer of the rectum might be the cause of utero-sacral cellulitis as stated in the paper, he was of opinion that, conversely, disease of the uterine parts might cause rectal troubles. The reflex relations, trophic and otherwise, of uterus, bladder, and rectum were very intimate. He lately had a case in which uterine inflammation

was followed by ulceration of the rectum, which was the more distressing of the two complaints to the patient.

Dr Haultain considered that Dr Fordyce was to be thanked for bringing before the Society such an eminently practical subject. In most points he entirely coincided with Dr Fordyce's views, and especially so with regard to those adopted with reference to dysmenorrhœa. From the absence of any remarks to the contrary from previous speakers, it appeared as if the old obstructive theory of dysmenorrhœa was regaining its former important position, in spite of the writings of Champneys and others. Utero-sacral contraction, with its usually associated anteflexion of the uterus, did not, in his experience, systematically tend to cause diminished menstruation, for in the majority of cases of nulliparæ with this condition which had come under his notice, increase of the menstrual flow had been observed. This was probably due to the anteflexion causing a secondary endometritis with uterine congestion. He would conclude by saying that from the evident interest with which the subject had been discussed by the Society, he hoped more papers of this practical nature would be brought forward.

The President congratulated Dr Fordyce on the choice of his subject and the able way he had treated it. Such papers on topics of practical importance would be fully appreciated by the Fellows of the Society, as was evident from the discussion which this one had elicited. He thought that the clearest cases of utero-sacral cellulitis were in nulliparæ; in multiparæ it was often difficult to exclude some inflammatory affection of the appendages, and say that it was simply a case of utero-sacral cellulitis. He agreed with Dr Fordyce that amenorrhœa was more frequent in inflammation of the utero-sacral ligaments, while menorrhagia was more frequent in inflammation of the appendages. He did not think that relief of dysmenorrhœa by dilatation with bougies was necessarily an argument for the theory that a kink on the canal with obstruction to the flow was the cause of the pain. Forcible dilatation meant rupture of the sphincter fibres, and it was possible that the pain had been due to a painful contraction of these analogous to tenesmus of the sphincter ani.

Dr Fordyce, in reply, said he was very pleased to have had his paper so freely discussed. Dr Ballantyne had anticipated his remarks in reply to Prof. Simpson. The symptoms of utero-sacral cellulitis in parous women were, he believed, peculiarly definite, but he would not attempt to make a diagnosis on these alone. In making a diagnosis of any pelvic condition, symptomatology must always be second in importance to direct physical examination. Both Prof. Simpson and Dr Webster considered that one disease was frequently accompanied by inflamed conditions of the tubes and ovaries, but so far as his experience went this was not the case. In the majority of cases the inflammation was of a very chronic character and the cellular tissue alone affected. There

was no doubt that frequently very troublesome rectal conditions arose secondarily to uterine disorders. A large subinvoluted retroflexed uterus was very likely to cause a troublesome mucous diarrhœa, and the spread of any local congestion to the rectum acted in the same way. He did not believe that the obstruction theory would account for any more than a very few of the cases of dysmenorrhœa. It was quite possible that the explanation offered by the President of the successful treatment by bougies in these cases was correct.

IV. ANTE-NATAL PATHOLOGY AND HEREDITY IN THE HIPPOCRATIC WRITINGS.

By J. W. Ballantyne, M.D., F.R.C.P.E.

In the various works which are usually grouped together under the general designation of "Hippocratic," are to be found the earliest opinions upon the subject of ante-natal pathology which the medical literature of Greece has handed down to modern times.[1] That there were medical writers in Greece before the time of Hippocrates cannot be doubted, and that the works ascribed to the "Father of Medicine" were immediately followed by those of other physicians, is likewise not to be questioned; but whilst nearly all the pre- and post-Hippocratic writings have been long lost to the world, most of those that were written by the Coan physician and his followers have been almost miraculously preserved. As Littré puts it, "Les écrits hippocratiques demeurent isolés au milieu des débris de l'antique littérature médicale."

It is neither necessary nor desirable that I should give here any space to considerations regarding the history of Hippocrates and of the works which bear his name, for all these matters have been ably dealt with by many authors. I shall, therefore, confine myself to the discussion of the various references in the Hippocratic writings which throw some light upon the views that the early Greek physicians held with regard to congenital diseases and deformities and to heredity. These views may simply be called "Hippocratic"; for while some of them doubtless originated with Hippocrates himself, others were almost certainly contributed either by the writers who preceded him or by those who immediately followed him. It may be taken for granted that they represent the outcome of medical opinion in Greece in the fourth, fifth, and sixth centuries B.C., the "golden age" of that country as regards literature, art, and oratory.

It will be well to look first at the direct references to ante-natal pathology to be found in the Hippocratic writings, and thereafter

[1] I have, in a recent article (*vide Teratologia*, vol. i. p. 127), dealt with the Chaldean teratological records, which were doubtless much more ancient than the Grecian.

to consider some matters relating to heredity, which can be gathered from a general survey of the whole series of treatises. Whilst the works of Hippocrates have been dealt with over and over again from many special standpoints, I am not aware that any one has up till now attempted to gather together the passages referring to fœtal morbid states, and to draw general conclusions therefrom with regard to the opinions then prevalent on such matters.

The number of individual cases of fœtal disease or deformity related in the Hippocratic works is very small,—disproportionately small when compared with the abundant clinical records of adult maladies; but it must be borne in mind that at the time when these treatises were written midwifery was nearly altogether in the hands of women, the physician being summoned only when operative interference of a grave nature was required. This fact, doubtless, explains, in some degree, the scarcity of observations; but there is still some cause for surprise that in such a work as Περὶ ἐγκατοτόμης ἐμβρύου (*Excision of the Fœtus*) there is no reference to fœtal deformity (*e.g.*, double terata) as an indication for the operation.

The two following cases may be given here in full, since they represent the only clinical records of individual instances of the occurrence of fœtal disease and deformity in the Hippocratic writings. They both occur in treatises which are generally believed to have been written by some of the descendants of Hippocrates. The first is contained in the second book of *The Epidemics*, which was perhaps the work of a son of the "Father of Medicine," and the second is in the fifth book of the same series.

General Fœtal Dropsy (?).[1]

The first was as follows: Ἡ Ἀντιγένεος, ἡ τῶν περι Νικομαχον, ἔτεκε παιδίον, σαρχῶδες μεν, ἔχον δὲ τὰ μέγιστα διακεκριμένα, μέγεθος δὲ ὡς τετραδάκτυλον, ἀνοστεον, ὕστερον δε παχὺ και στρογγυλον· ἀύτη δὲ ἀσθματώδης ἐγένετο πρὸ τοῦ τοκον· ἔπειτα ἅμα τῷ τόκῳ πῦον ἀνήμεσεν ὀλίγον, [οἷ]ον] ἐκ δοθιῆνος. (Translation)—*The wife of Antigonus, who belonged to the household of Nicomachus, gave birth to a fleshy fœtus, which had the larger parts distinct, was four inches in length, and was without bones; the placenta was thick and round. This woman was oppressed before the labour, then during the confinement she threw up a little pus, as if it had arisen from a boil.* There is some reason for supposing that the fœtus in this case was affected with general dropsy, and I have elsewhere[2] placed it among the records of this ante-natal malady; but, of course, the details given are insufficient to warrant any positive statement on the question.

[1] Ἐπιδημῶν, Book ii. sect. 2, par. 19. *Vide* Littré's *Œuvres Complètes d'Hippocrate*, v. p. 93, 1846.

[2] Ballantyne (J. W.), *Diseases of the Fœtus*, vol. i. p. 103, 1892.

Amniotic Bands (?).

Of the second case[1] it will only be necessary to give the translation:—*A pregnant woman, at Larissa, lost at the tenth month much blood for a fortnight, especially during the three days which preceded the confinement. On the fourteenth day the infant was born dead, and having the right arm adherent to the thorax* (ἔχον τὸν δεξιὸν βραχίονα προσπεφυκότα τῇ πλευρῇ); *the chorion came away three days afterwards, during the night, at the same hour as the infant had been born. The lochial discharge which followed proceeded for three days and three nights in moderate quantity; after this, fever occurred for two days and two nights; and the woman suffered in the whole abdomen and thighs, but especially in the sub-umbilical region.* This was in all probability an example of attachment of the upper limb to the trunk by means of amniotic bands, and the clinical details (hæmorrhage before labour, retention of the membranes, etc.) are very interesting.

These two cases, although of little intrinsic value, serve to show that at the time when Hippocrates wrote attention was paid to the condition of the fœtus at birth; but they do not yield any information as to the views held by the "Father of Medicine" himself in regard to ante-natal pathology. His opinions are to be gathered, not from the record of individual cases, but from certain general statements which he makes in several of his well-known treatises, and of these by far the most important are contained in his work on the *Articulations.*

Congenital Dislocations.

The extent and accuracy of the knowledge possessed by Hippocrates on the subject of congenital dislocations have excited the admiration of modern writers, and until a comparatively recent time examples of certain of the luxations described by him had not been recorded. With regard, for instance, to congenital dislocation at the shoulder-joint, little or nothing was known save what was contained in the writings of Hippocrates, till R. M. Smith[2] and Guerin[3] discussed the lesion in their works. In giving the description of the various ante-natal dislocations I shall make use of the admirable English translation of the Hippocratic writings made by Dr Adams for the Sydenham Society.[4]

Congenital Dislocation at the Shoulder-joint.—"When attempts to reduce a dislocated shoulder have failed, if the patient be still growing, the bone of the affected arm will not increase like the sound one, for although it does increase in so far it becomes

[1] Ἐπιδημιῶν, Book v. par. 13. *Vide* Littré's *Œuvres Complètes d'Hippocrate*, v. p. 213, 1846.

[2] Smith (R. M.), *Dublin Journal of Medical Science*, xv. p. 249, 1839.

[3] Guerin, *Recherches sur les luxations congénitales*, 1841.

[4] *The Genuine Works of Hippocrates*, vols. i. and ii. London: Sydenham Society, 1849.

shorter than the other one; and those persons called Weasel-armed (γαλιάγκωνες) become so from two accidents,—either from having met with this dislocation *in utero*, or from another accident, which will be described afterwards. . . . Those who are thus affected from birth are quite able to use the arm, yet neither can they raise the arm to the ear by extending the elbow, but they do this much less efficiently than with the sound arm." (*Adams' Trans.*, ii. p. 581.)

Congenital Dislocation at the Elbow-joint.—"In congenital dislocations the bones below the seat of the injury are shorter than natural, and, mostly, those nearest to the place,—namely, the bones of the fore-arm; next, those of the hand; and, third, those of the fingers. The arm and shoulder are stronger, owing to the nourishment which they receive, and the other arm, from the additional work which it has to perform, is still more strong. Wasting of the flesh takes place on the inside if the dislocation be on the outside; or otherwise, on the side opposite the dislocation." (*Adams' Trans.*, ii. p. 589.)

Congenital Dislocation at the Wrist.—"In congenital dislocations (at the wrist) the hand becomes shortened, and the atrophy of the flesh occurs, for the most part on the side opposite to the dislocation." (*Adams' Trans.*, ii. p. 591).

Congenital Dislocation at a Finger-joint.—"When the dislocation takes place at birth, during adolescence the bones below the dislocation are shortened, and the flesh is wasted rather on the opposite than on the same side with the dislocation." (*Adams' Trans.*, ii. p. 592.)

Congenital Dislocation at the Hip-joint.—"Those persons are most maimed who have experienced the dislocation (*inwards*) *in utero;* next, those who have met with it in infancy; and, least of all, those who are full-grown. . . . Those who are children when this accident befalls them, generally lose the erect posture of the body, and crawl about miserably on the sound leg, supporting themselves with the hand of the sound side resting on the ground. . . . From exercise, then, the fleshy parts on the hand and fore-arm are not atrophied in weasel-armed persons, and by these means the arm, too, gains strength. But in dislocation inwards at the hip-joint, whether from birth or from childhood, the fleshy parts, on that account, are much more atrophied than those of the hand, because the patients cannot exercise the leg. . . . When the head of the femur is dislocated *outwards*, the limb in these cases, when compared with the other, appears shortened; and this is natural, for the head of the femur no longer rests on a bone, as in dislocation inwards, but along the side of a bone which naturally inclines to the side, and it is lodged in flesh of a pulpy and yielding nature, and on that account it appears more shortened. . . . When this dislocation occurs *in utero*, and when the dislocation having occurred at any time before manhood, from violence, has not been replaced

. . . whether the bone become necrosed or not, the bone of the thigh is much shortened, and does not usually grow like the sound one; the bones, too, of the leg become shorter than those of the other, but in a small degree, for the same reasons that were formerly stated; such persons can walk, some of them in the same fashion as adults having an unreduced dislocation, and some of them walk with the whole foot on the ground, but limp in walking, being obliged to do so by the shortness of the limb. . . . The fleshy parts of the entire limb are more wasted than those of the sound limb; but this is much less apt to happen in their case than in dislocations inwards, owing to usage and exercise, as they are speedily able to make use of the limb. . . . There are persons who, from birth or from disease, have dislocation *outwards of both the thighs;* in them, then, the bones are affected in like manner, but the fleshy parts in their case lose their strength less; the legs, too, are plump and fleshy, except that there is some little deficiency at the inside, and they are plump because they have the equal use of both their legs, for in walking they totter equally to this side and that. Their nates appear very prominent, from the displacement of the bones of the joint. . . . When, from birth, or during one's youth, dislocation *backwards* occurs, and is not reduced . . . the bone of the thigh becomes shortened, the whole limb is impaired, is arrested in its growth, and loses its flesh from want of use; the articulation at the ham is also impaired, for the nerves (ligaments?) become stretched, . . . wherefore those who have this dislocation cannot make extension at the knee-joint. . . . The impairment, then, is greater in this variety of dislocation than in the others, for the whole limb is wasted, both in its bones and in its fleshy parts. Such persons, then, when they attain their full growth, keep the limb raised and flexed, rest the weight of the body on the other leg, and support themselves with a staff, some with one, and others with two. . . . When this dislocation (*forwards*) occurs in infancy, and is not reduced, or when it is congenital, in these cases the bone of the thigh is more atrophied than those of the leg and foot; but the atrophy of the thigh bone is least of all in this form of dislocation. The fleshy parts, however, are everywhere attenuated, more especially behind. . . . If properly trained, such persons, when they grow up, can use the limb which is only a little shorter than the other, and yet they support themselves on a staff at the affected side." (*Adams' Trans.*, ii. pp. 619–631.)

Congenital Dislocation at the Ankle-joint: Club-foot.—"Some of these congenital displacements, if to a small extent, may be reduced to their natural condition, and especially those at the ankle-joint. Most cases of congenital club-foot are remediable, unless the declination be very great. . . . The best plan, then, is to treat such cases at as early a period as possible, before the deficiency of the bones of the foot is very great, and before there is any great wasting of the flesh of the leg. There is more than one variety

of club-foot, the most of them being, not complete dislocations, but impairments connected with the habitual maintenance of the limb in a certain position. In conducting the treatment, attention must be paid to the following points: to push back and rectify the bone of the leg at the ankle from without inwards, and to make counter-pressure on the bone of the heel in an outward direction, so as to bring it into line, in order that the displaced bones may meet at the middle and side of the foot; and the mass of the toes, with the great toe, are to be inclined inwards, and retained so; and the parts are to be secured, with cerate containing a full proportion of resin, with compresses, and soft bandages in sufficient quantity, but not applied too tight; and the turns of the bandages should be in the same direction as the rectifying of the foot with the hands, so that the foot may appear to incline a little outwards. And a sole made of leather not very hard, or of lead, is to be bound on, and it is not to be applied to the skin but when you are about to make the last turns of the bandages. And when it is all bandaged, you must attach the end of one of the bandages that are used to the bandages applied to the inferior part of the foot on the line of the little toe; and then this bandage is to be rolled upwards in what is considered to be a sufficient degree to above the calf of the leg, so that it may remain firm when thus arranged. In a word, as if moulding a wax model, you must bring to their natural position the parts which were abnormally displaced and contracted together, so rectifying them with your hands, and with bandaging in like manner, as to bring them into their position, not by force, but gently; and the bandages are to be stitched so as to suit the position in which the limb is to be placed, for different modes of the deformity require different positions. And a small shoe made of lead is to be bound on externally to the bandaging, having the same shape as the Chian slippers had." (*Adams' Trans.*, ii. p. 632.)

Congenital Dislocation at the Knee-joint.—"Accidents at the knee are more mild than at the elbow, from its being more compact, regular, and elegant in its construction; and, therefore, it is more readily dislocated and reduced. It is most frequently dislocated inwards, but also outwards and backwards. . . . In dislocations backwards which are not reduced the patient cannot bend the joint, but neither can he, to any great extent, in the other varieties; the thigh and leg are wasted in front; but if inwards the patients become bow-legged, and the external parts are wasted; but if outwards they become more bandy-legged, but the impediment is less, for the body is supported on the larger of the bones, and the inner parts are wasted. When these accidents happen at birth, or during adolescence, they follow the rule formerly stated." (*Adams' Trans.*, ii. p. 651.)

Such are the passages in the *Articulations* bearing upon the subject of congenital dislocations, and the information contained in them is also to be found in a condensed form in the treatise

named *Mochlicus*. It must always remain a mystery how Hippocrates acquired such an extensive and accurate knowledge of ante-natal luxations; and even if it be admitted that some to which he referred were produced during the act of birth, our wonder is little, if anything, diminished. This is specially true of congenital dislocation of the shoulder,—a condition so rarely seen that Ermano, a recent writer on the subject, has been able to collect from literature only four certain and three doubtful cases.[1]

Pathogenesis of Congenital Dislocations, etc.

In his treatise on the *Articulations* Hippocrates gives no indication as to the views he held regarding the cause of the dislocations *in utero* which he described; but in the work *De Genitura*, which is undoubtedly very ancient, although probably not written by the "Father of Medicine" himself, are found some interesting remarks upon this question. The passage may be rendered thus:[2] *As to the infant crippled (maimed) in the womb, I say that it is crippled in consequence of a contusion, the mother having been struck on the place corresponding to the fœtus, or having had a fall, or having sustained some other form of violence. If the infant experience a contusion, it becomes crippled in the part contused; if the contusion be greater, the membrane which surrounds it ruptures, and the woman aborts. Or yet again, infants become crippled in the following way: when in the womb there is narrowness at the part where in fact the crippliny is produced, it is inevitable that the body moving in a narrow place shall be crippled in that part. It is thus that trees which in the earth have not enough space, and are hindered by a stone or other thing, become bent during growth, or rather become larger in one part and small in another. The infant experiences the same thing when in the womb a portion is relatively too narrow for the corresponding part of the infant.*

Then follows an interesting passage, in which the writer says—*As to the infants of crippled people, they are for the most part born healthy; in fact, the mutilated part has exactly the same composition as the healthy; but if the parent be affected with any disease, and if the four naturally-existing kinds of humidity which furnish the semen (sperm) do not give a complete generation, but that which comes from the crippled part be more feeble, then it is not astonishing, it seems to me, if the infant be crippled like the parent.*

It would seem from the above quotations that Hippocrates and his followers recognised two, if not three, methods in which intra-uterine lesions might be produced. The traumatic mode of origin is clearly stated above, and nothing further need be said about it, save that even within recent times teratologists have looked for the cause of fœtal deformities in accidents to the mother. With regard to "narrowness of the uterus" as an etiological factor in

[1] *Vide* Abstract of Ermano's paper in *Teratologia*, vol. i. p. 114.
[2] Littré's *Œuvres Complètes d'Hippocrate*, vii. p. 485, 1851.

teratology, it is interesting to note that recent writers have practically adopted the Hippocratic theory, although they have substituted for the pressure of the uterus itself that of the amnion, of amniotic bands, or of the umbilical cord. The hereditary transmission of certain malformations is only hinted at in the above passages, and since also it is more fully stated in another place, I shall at present defer its consideration. I may, however, say a few words with regard to the Hippocratic opinions concerning yet another theory of origin of congenital abnormalities,—that, namely, which ascribes them to "maternal impressions." It is not, to my mind, at all certain that Hippocrates himself believed in the potency of such impressions. There is, it is true, a story that he was instrumental in saving a woman who was accused of adultery by stating that the dissimilarity in colour which existed between the alleged illegitimate child and the woman's husband was due to the fact that during pregnancy she had spent much time in the contemplation of a picture exactly resembling the child in her room; but there is no record of such a tale in any of the Hippocratic writings, and it is in all probability fabulous.[1] Then, again, in the treatise *De Superfœtatione* there occurs the following distinct statement[2]:—*If a pregnant woman has a longing to eat earth or coals, and eats of them, the infant which is born carries on its head the mark of these things.* This statement, however, occurs in a work which is not mentioned by any of the ancient authorities, and is rejected by practically all the modern. There is, therefore, no absolute proof that Hipprocrates was a believer in one of the most popular and long-persisting beliefs concerning fœtal deformities,—that, namely, which ascribes them to the action of the mother's imagination.

Miscellaneous Fœtal Diseases.

Before passing to the consideration of the Hippocratic views on heredity, I may here complete my review of the direct references to ante-natal disease and deformity contained in the various treatises.

There is in the work on *Diseases* (Περὶ νούσων), which is not usually regarded as genuine, a somewhat curious statement with regard to worms in the fœtus. It is affirmed that flat worms develop in the unborn infant, and the reason given is that the fæces are expelled so soon after birth that there would not be sufficient time during extra-uterine life for the formation of creatures of such a size. The same remark applies to round worms. The proof of these statements is to be found in the fact that many infants expel both these varieties of parasites with the first stool. It is difficult to know what to make of the above

[1] D. Turner, in his treatise on *Diseases of the Skin* (fifth edition, p. 169, 1836), quotes St Jerome (*Lectures upon Genesis*) as the authority for this story.

[2] Littré's *Œuvres Complètes d'Hippocrate*, viii. p. 487, 1853.

opinions: for with the exception of certain cases in some of the seventeenth and eighteenth century writers,[1] there are no records in medicine of the occurrence of vermes in the infant at birth. It is possible that other things, such as dried pieces of mucus, may have been erroneously regarded as worms.

There is a passage in the *Coan Prognostics*[2] (which are by many regarded as more ancient than the time of Hippocrates), in which certain congenital diseases are referred to in an indirect manner. The passage may be rendered thus:—*The following diseases are not developed before puberty: peripneumonia, pleurisy, gout, nephritis, varicose veins on the legs, menorrhagia, non-congenital cancer, non-congenital "leucé"* (λεύκη), *inflammation of the spinal cord, hæmorrhoids, and non-congenital ileus.* From this statement it may be gathered that the physicians of the Hippocratic era were acquainted with congenital cancer, congenital ileus, and with what they named congenital λεύκη. With regard to the nature of λεύκη, there is considerable doubt; it may have been the disease which now goes under the name of vitiligo or of leucoderma, or it may have been elephantiasis Græcorum. Neither is it certain what "congenital ileus" could have been: but it is possible that it may have been an imperforate condition of the rectum, which would, of course, have produced symptoms similar to those of ileus in later life. The passage, therefore, although obscure, is of value in throwing some light upon the knowledge the Greek writers had of congenital maladies.

From the two small treatises[3] (of high antiquity) entitled *De Septimestri Partu* (Περὶ ἑπταμήσου), and *De Octimestri Partu* (Περὶ ὀκταμήσου), some further information is to be got concerning Hippocratic ideas of ante-natal maladies. It is stated in them that whilst some of the infants born at the seventh month may survive, very few eight months' fœtuses live; and the somewhat curious reason given to explain this alleged fact is, that during the eighth month of intra-uterine life the fœtus is affected with various maladies. If the infant be born at the seventh month it escapes the forty days of illness, and so may live; but if it be expelled at the eighth month, it will be so weakened by its recent sufferings that it cannot survive. It is further stated, that infants born crippled, blind, or suffering from some other infirmity, are so because they were seriously ill during the eighth month. Others that were also gravely affected during that period die before the crippling, blindness, etc., have time to develop. On the other

[1] In Kerking's *Opera Omnia* (p. 154, Lugduni Batavorum, 1717), for instance, the following passage occurs: "Alterum etiam, quod mirabile visum est occurrit in fœtu sex mensium et medii, qui ventriculum habebat triplo majorem, quam solent alii, qui tanto tempore lucem vitalem, in utero materni vitali carcere exspectaverunt. In hoc autem tanta ventriculi capacitate membrana, et in illa vermes erant, iis, quibus pueri sæpe laborant, similes."

[2] Littré's *Œuvres Complètes d'Hippocrate*, v. p. 701, 1846.

[3] *Ibid.*, vii. pp. 432-461, 1851.

hand, some that have only suffered to the usual extent during the forty days following the intra-uterine change in position (the *culbute*) remain weakly, but if born at the full time may recover; but if they are expelled at the eighth month they cannot be saved, for they are so weak that they cannot withstand the trying effects of the change in environment incident on birth. It is for the same reason difficult to rear those born at the beginning of the ninth month. Another reason is given as a proof of the eighth month maladies from which the fœtus suffers, and it is this,—infants born at the ninth month are feeble (of small size), whilst those born at the seventh are plump and well nourished, for the latter have escaped the diseases incident to the eighth month. In these treatises, also, mention is made of the dangers to life to which the fœtus is exposed from the coiling of the umbilical cord round the neck. The Hippocratic views concerning the non-viability of eight months' infants were accepted without criticism by medical men everywhere until quite recent times, and even at the present day the popular belief (often expressed in my hearing) still is that whilst a seven months' baby *may* live, an eight months' one *cannot*.

It is interesting to find it stated in the treatise *De Octimestri Partu* that some infants being set free at birth from the pressure of the uterus become abnormally large. This is not growth, but swelling, and may be followed by death. In fact, if the swelling does not disappear within three days or a little longer, diseases will follow. It is just possible that we have here an allusion to œdema neonatorum. The great mortality amongst new-born infants is ascribed to the dangers caused by the sudden change from an intra-uterine to an extra-uterine existence, and it is aptly pointed out that even in adults an alteration in the environment may be fatal. It is further stated that whilst *in utero* the umbilical vessels afford the only means of access to the body; after birth the various passages into the organism are thrown open, a change which brings with it many dangers.

There is an indication in one of the Hippocratic writings which shows that it was believed that intra-uterine disease or death so affected the mother that the occurrence of either of these things could be diagnosed from the maternal health. It is stated in the treatise *De morbis muliebribus* that *when in the case of a woman at the seventh or eighth month of pregnancy the mammary glands and the abdomen suddenly diminish in size, so that the breasts become small and the milk does not appear, it may be said that the infant is dead, or that if alive it is weakly.*[1] Somewhat the same idea occurs in the fifth section of the *Aphorisms*, a work usually regarded as genuinely Hippocratic, in which it is affirmed that *in a pregnant woman, if the breasts suddenly lose their fulness, she has a miscarriage.*[2]

[1] Littré, *op. cit.*, viii. p. 71.
[2] "Hippocrates," *Sydenham Soc. Trans.*, ii. p. 744.

An obscure reference to fœtal malaria is possibly contained in the treatise on *Airs, Waters, and Places*, in which it is stated that women who drink unwholesome water from marshes have difficult labours, that their infants are large and swelled, and that during nursing they become wasted and sickly (*Adams' Trans.*, i. p. 196). Few recent writers, it is true, allude to fœtal malaria; but Felkin (*Edin. Obstet. Trans.*, xiv. p. 71, 1889) recorded cases in which the large size of the spleen in malarious fœtuses caused difficulty in delivery. In the same treatise Hippocrates noted that certain atmospheric and climatic conditions led to miscarriage, and that even if the infants were born at the full time, still they were tender, sickly, and prone to die.

Double Terata and Twins.

That the occasional occurrence of double monsters was a fact known to the Hippocratic school, is indicated by a passage in *De morbis muliebribus*, where it is said that labour is gravely interfered with when the infant is dead, or apoplectic, or double. There is also a reference to monochorionic twins (which are by modern teratologists regarded as monstrosities) in the treatise *De Superfœtatione*, where it is stated that *a woman, pregnant with twins, gives birth to them both at the same time, just as she has conceived them; the two infants are in a single chorion.*[1] But in the work on the *Nature of the Infant*,[2] whilst we are told that twins are the result of a single coitus, we are also informed that each infant has a chorion; so that both kinds of plural gestation (monochorionic and dichorionic) were known to the ancients. In the latter treatise it is stated further that the twins may be male and female, or both males, or both females; the male is formed when the semen is thick and strong.

Abnormalities of the Fœtal Annexa.

The allusion to the fœtal annexa in twin pregnancies naturally leads us to inquire into the Hippocratic views regarding abnormal conditions of the membranes and cord; but it is not necessary here to refer to the ideas, some of which were erroneous, which then prevailed with respect to the normal structure and functions of these parts.

In the treatise *De Octimestri Partu* there is, as has been already stated, a reference to coiling of the umbilical cord round the neck of the fœtus. This coiling was indeed regarded as one of the dangers of the eighth month, and the mode of its production even is described. It is said that if the cord be extended along one side of the uterus, and the fœtus lie more to the other side than when the *culbute* is performed, the funis must necessarily form a loop round the neck or chest of the infant. If it remain in this position, it is further stated, the mother will suffer later, and the fœtus

[1] Littré, *op. cit.*, viii. p. 485. [2] *Ibid.*, vii. p. 541.

will either perish or be born with difficulty.[1] If the Hippocratic writers knew that this coiling is sometimes quite innocuous, they did not in any place state the fact.

Uterine "moles" are referred to in two or three treatises,—in the fifth book of *The Epidemics* and in *De morbis muliebribus* (Book i.). In the former reference it is related how a married woman had her menstrual flow almost completely suppressed for four years. She gave birth at the ninth month to a living female infant that had a wound (?) on the hip, and afterwards expelled the secundines. She lost a large quantity of blood on the following day; and for four days the hæmorrhage continued, along with the expulsion of clots. Fever lasted for ten days; and the face became swollen, as well as the legs, feet, and one thigh. The abdomen diminished a little in size after the expulsion of the fœtus, but did not completely return to the normal, and was still hard, but not painful. On the fortieth day the "product of the superfœtation" was expelled; it was a fleshy mass. Thereafter the symptoms disappeared, and the woman recovered. What is called the product of the superfœtation was evidently a fleshy mole; but the date of its expulsion, and the statement that the secundines had been normally expelled at the time of delivery, were interesting clinical facts. The passage in the first book of the *Diseases of Women* gives us the Hippocratic theory of origin of "moles"; but it must be noted that from other references it is evident that a clear distinction between uterine tumours (*e.g.*, fibroids) and "moles" properly so called, was not always made. Hippocrates believed that the menses furnished the material for generation, whilst the male semen gave it form and movement. Now, if the menstrual fluid was abundant, and the semen small in amount and diseased, normal conception did not occur, although the abdomen seemed full as in a natural pregnancy. No movement, however, was felt in the abdomen, and the swollen mammæ did not form milk. This state lasted for two years, sometimes for three. Then a fleshy mass was expelled, and if the accompanying hæmorrhage was slight the patient recovered; if excessive, she perished.

Heredity.

In order to understand the Hippocratic theory of heredity, it is necessary to remember what was then believed with regard to generation, and this is to be found in the treatise *De Genitura*.[2] The sperm (semen) is derived from the whole body, as well from the solid parts as from the soft, and also from all the fluid (humours) that is in the body. The four humours are then enumerated, and the writer goes on to state that the body of the male as well as that of the female furnishes the semen. That

[1] Littré's *Œuvres Complètes d'Hippocrate*, vii. p. 455, 1851.
[2] *Ibid.*, vii. p. 475.

which is weak (unhealthy) is derived from weak (unhealthy) parts, that which is strong (healthy) from strong (healthy) parts, and the fœtus will correspond to the quality of the semen. If the semen of one part come in greater quantity from the male than from the female, this part will resemble more closely the father; if, however, it comes more from the female, the part will rather resemble the mother. If it be true that the semen comes from both parents, then it is impossible for the whole body to resemble either the mother or the father, or neither the one nor the other in anything, but necessarily the child will resemble both the one and the other in something. The child will most resemble the one who contributes most to the formation of the parts. Such was the Hippocratic theory of generation and heredity, and it was ingeniously used to explain the hereditary nature of certain diseases and malformations. In speaking of the sacred disease (epilepsy), for instance, Hippocrates says[1]:—"Its origin is hereditary, like that of other diseases;[2] for if a phlegmatic person be born of a phlegmatic, and a bilious of a bilious, and a phthisical of a phthisical, and one having spleen disease of another having disease of the spleen, what is to hinder it from happening that where the father and mother were subject to this disease certain of their offspring should be so affected also? As the semen comes from all parts of the body, healthy particles will come from healthy parts, and unhealthy from unhealthy parts."

The Hippocratic writers were, however, quite well aware that the above rule could not be rigidly applied to congenital malformations; and I have already, when dealing with their views on the etiology of fœtal dislocations, pointed out that the ingenious manner in which the well-known fact that the children of crippled people are often quite healthy was explained. From the following passage, also, it will be seen that the followers of Hippocrates recognised that other factors might interfere with the action of heredity. In the treatise *De Genitura*[3] it is stated that sometimes thin and feeble infants are born to parents that are vigorous and large. If this occur after several other infants, manifestly the fœtus has been ill in the womb; it has been rendered feeble through a portion of the nourishment passing outside the abnormally gaping uterus. If all the infants which are born are feeble, then the womb is the cause: it is narrower than it ought to be. For if the fœtus have not space enough wherein to develop, necessarily it will be thin; but if it have room, and if it be not affected with any disease, without doubt the child of tall parents will be tall. The well-known comparison of the growth of the

[1] *Adams' Translation*, vol. ii. p. 847.

[2] In the second book of the *Prorrhetics*, it is stated that diseases such as dropsy, consumption, gout, and epilepsy are more difficult to remove if hereditary.

[3] Littré's *Œuvres Complètes d'Hippocrate*, vii. p. 483.

fœtus *in utero* to that of a gourd in a bottle is added to give force to this reasoning.

Finally, it is necessary to note the Hippocratic views with regard to the vexed question of the possibility of the transmission of acquired malformations, and this leads to the consideration of the famous passage in *De æris aquis, et locis*, which describes the macrocephali. The passage has been rendered thus[1]:—"There is no other race of men which have heads in the least resembling theirs. At first, usage was the principal cause of the length (in a vertical direction) of their head, but now nature co-operates with usage. . . . It is thus with regard to the usage: immediately after the child is born, and while its head is still tender, they fashion it with their hands, and constrain it to assume a lengthened shape by applying bandages and other suitable contrivances whereby the spherical form of the head is destroyed, and it is made to increase in length (height). Thus, at first, usage operated, so that this constitution was the result of force; but, in the course of time, it was formed naturally, so that usage had nothing to do with it; for the semen comes from all parts of the body,—sound from the sound parts and unhealthy from the unhealthy parts. If, then, children with bald heads are born to parents with bald heads; and children with blue eyes to parents who have blue eyes; and if the children of parents having distorted eyes squint also for the most part; and if the same may be said of other forms of the body, what is to prevent it from happening that a child with a long head should be produced by a parent having a long head?"

Many recent writers, including Baer, Rathke, and Tiedemann, have endeavoured to identify the macrocephali of Hippocrates; but with the various theories they have advanced I need not here occupy myself. The passage has been quoted to prove that Hippocrates believed in the transmissibility of acquired characters; that he was, if such a gross anachronism is permissible, a Darwinian and not a follower of Weismann. But—and this is very important—he insisted upon the fact that it was only after many generations that the malformation, at first artifically produced, became a hereditary character of the race. Whether Hippocrates suspected the existence of modifying environmental conditions other than the moulding appliances of this macrocephalous tribe, it is difficult to determine; but in a passage in which the Scythians are described there are references to the effect of climate which the modern evolutionist might regard as an affirmative answer to this question.

In conclusion, it is scarcely necessary for me to point out the resemblance which exists between the Hippocratic theory of heredity and the Darwinian hypothesis of gemmules and

[1] *Adams' Translation*, i. p. 207.

pangenesis. Had the Greeks had a more accurate knowledge of the phenomena of reproduction, the resemblance would possibly have been even more striking than it is.

General Conclusions.

1. Whilst the Hippocratic writers were to a slight extent acquainted with fœtal diseases and knew of the existence of double terata, their knowledge of some of the deformities which do not interfere with extra-uterine life (viz., congenital dislocations) was wonderfully extensive and accurate. The scarcity of direct references to cases of fœtal disease and deformity may be due either to the fact that midwifery practice was then almost entirely in the hands of women, or to the small value set upon the life of such morbid infants. It may also be that such things were regarded as having a religious rather than a medical significance. It is also, of course, quite possible that Grecian teratological records may have existed but have been lost, for the discovery of the Royal Library of Nineveh has demonstrated the existence of such records in that still more ancient civilisation.

2. Some knowledge of the morbid states of the fœtal annexa and of their influence on the fœtus was possessed by the Hippocratic writers, for there are records of the coiling of the umbilical cord and of the expulsion of "moles."

3. Several possible factors in the production of ante-natal morbid states were recognised, viz.,—maternal traumatism, and possibly also mental impressions, the narrowness of the uterus (the modern equivalent of which may be narrowness of the amnion), direct heredity, and the transmission of acquired characters.

4. The Hippocratic theory of heredity bears a striking resemblance—modified, of course, by the absence of a knowledge of embryological conditions—to the modern theory of gemmules and pangenesis as stated by Darwin. Whilst it does not, therefore, suggest in any way the conclusions to which Weismann has come, it at the same time indicates that acquired characters were not easily rendered hereditary.

The President said it was difficult to appreciate the amount of painstaking research a paper like this implied, and the Fellows were indebted to Dr Ballantyne for giving them such a valuable summary of what the Hippocratic School knew on this subject. It was important to be reminded how much careful observation was done at that period. Because these men had not the instruments for research that we possessed now, we were apt to regard them as children in science, while in reality they were men, and used the power of unaided observation to better purpose than we did now, as we were apt to be too dependent on our instruments. Dissection of the human subject was not practised at that time; but there was no reason why we should not find careful records of

all that could be learned without dissection. It must also be remembered that Hippocrates gathered up the results of the work of many hands, and that there may have been many other treatises which have been lost, and much good work done which was not recorded. On the other hand, we must not credit those writers with knowledge which they could not possibly possess. In reproducing their ideas, care is required in the use of modern scientific terms which might convey the impression that they had such knowledge. For example, to speak of Hippocrates as knowing about "binovular twins" is misleading, as he did not know about the human ovum.

Dr J. W. Ballantyne, in reply, said that he was gratified by the interest which the Hippocratic views on ante-natal disease and heredity had excited. He would take the President's hint, and substitute the words "monochorionic" and "dichorionic" for "uniovular" and "binovular," as the Hippocratic writers were certainly in ignorance concerning the existence of the ovum in the ovary. He also agreed with the President in thinking that Hippocrates had no experience in dissections of the human body; but it was a mystery how he had so mistaken the characters of the human placenta, regarding it, as he did, as possessed of cotyledons which the fœtus sucked nourishment from. He might add that many of the Hippocratic writings from which he had quoted were not included in the Sydenham Society's translation, but could be found along with the Greek text in Littré's *Œuvres Complètes d'Hippocrate.*

MEETING IV.—FEBRUARY 13, 1895.

DR A. H. FREELAND BARBOUR, *President, in the Chair.*

I. The following gentlemen were elected Ordinary Fellows of the Society:—John Montgomery, M.B. Edin., Mary Street, Balsall Heath, Birmingham; R. C. Buist, M.D., Annfield House, Dundee; R. Ferguson, M.B., Anstruther; A. Kennedy Melville, M.D., 35 Mayfield Gardens; W. H. Stephenson, L.R.C.P. & S.E., 137 Rochdale Road, Manchester; A. V. Macgregor, M.B. C.M., The Hospital, Hartlepool; C. W. Donald, M.B. C.M., Kousgarth, Braid Road; and Oguntola Sapara, L.R.C.P. & S.E., Lagos, W.C. Africa.

II. *Dr Kynoch*, Dundee, showed a specimen of FIBROMA OF THE OVARY removed post-mortem. The woman, 52 years of age, was admitted into the medical wards of the Dundee Royal Infirmary, under the care of Dr Stalker, in a semi-comatose condition, and died forty-eight hours after admission. Before death a swelling was felt in the left iliac region, but the condition of the patient did not

permit of a pelvic examination. At the post-mortem made by Dr Raw (who kindly handed him the specimen) there was found this solid tumour—as large as a cocoa-nut—of the left ovary. Microscopic examination showed that the tumour consisted of fibrous connective tissue. There was no ascites. The cause of death was chronic bronchitis.

III. *Dr Buist*, Dundee, showed—(1.) Specimen of ORGANISED CLOT between the placenta and membranes. The case was as follows:—Mrs H., 29; sixth pregnancy; no miscarriages. She missed her period in August, but was freely unwell in September, since which she had not menstruated. The pregnancy had, so far as patient knew, been quite normal. She had had no hæmorrhage, no accident. I was called by the midwife, but the child was born by the breech before my arrival. It was a very small male, with no testicle in the scrotum. It lived twenty-three days, and then died of bronchitis. The placenta, which I delivered, looked as if it consisted of two, one on top of the other, the ordinary placental tissue being separated from the membranes by a firm pale mass. This on section presents the characters of an organised clot. The umbilical cord passes into the mass, and seems at that point compressed, as if by contraction of the clot. The cord splits before it gets completely through the clot, and there are several offsets passing from the outer surface of the chorion through the clot to the placenta. The membranes, both chorion and amnion, are adherent to the cord for some distance, and at the edge of the clot the amnion shows adhesion between adjacent parts of its internal surface, as if it had been pressed into a sharp fold and the surfaces had adhered. The interest of the specimen is in the somewhat unusual situation of the clot, and the facts that, if the patient can be trusted, a hæmorrhage so extensive took place without the slightest external sign, and certainly without interrupting the pregnancy, which continued long enough, at least, for the clot to become organised.

(2.) PLACENTA, showing clots in its substance. Mrs F., 20; first pregnancy. *Sept.* 17.—In the sixth month of pregnancy she walked a considerable distance (two miles) rapidly. *Sept.* 18.—Vaginal hæmorrhage and pains set in. Os closed. Vagina contained clots. Fœtal heart audible. Treatment, rest and opium. *Sept.* 19.—Pain and hæmorrhage have ceased. Fœtal heart audible. *Sept.* 25.—Hæmorrhage and pains set in again to-night. Os patulous. No fœtal heart sounds. *Sept.* 26, 4 A.M.—Bore a dead male fœtus. Skin peeling. Placenta showed recent clots on uterine surface; on section, in its substance. The interest of the specimen is chiefly for contrast with the case of organised clot. It is, however, interesting to note that, though the fœtus had been alive a week before the labour, the skin was found peeling.

(3.) SECUNDINES, discharged spontaneously two months after

discharge of the fœtus. Mrs H.; fifth pregnancy. Menstruated last in February; ten weeks later (May) she had black discharge, then flooding. She was under treatment, and got "first something to stop the flooding, and next something to stop the pain." A month later, in the beginning of June, the black discharge returned, and she had severe headache. The discharge continued. I saw her for the first time a fortnight later (June 15), found the os closed, the uterus large and anteflexed; diagnosed subinvolution, and prescribed ergotin. Next day I found that she had gone to work. *July* 19.—Discharge returned. *July* 28.—Pain returned. *July* 30.—Pain was very severe to-day, and the discharge has become freer and lighter. I saw her for the second time, and removed from the vagina the placenta and membranes complete, and free from offensive odour.

IV. *Dr Halliday Croom* showed MYXOMA OF CHORION.—Mrs S., æt. 53, admitted to Ward 28 on December 26, 1894. *Complaint.*—Severe vomiting; hæmorrhage from vagina. *Duration.*—Two months. *Family.*—Seven; youngest æt. 12 years; no miscarriages. *Menstruation.*—During the last four months menstruation every fourteen days, lasting one and a half day. Previously menstruation had been regular and normal. During the past month has had several slight vaginal hæmorrhages, the largest being on the day of her admission to the hospital. As regards her *family history,* there is one interesting point,—that her aunt had borne a full-term child at the age of 53. On examination of the abdomen, the uterus was felt projecting somewhat above the brim, and on vaginal examination the uterus was felt soft and contractile. Projecting through the os a spongy, easily broken down mass was felt. A certain amount of hæmorrhage was going on. On the night of the 27th, the day after admission, patient had several bearing-down labour-like pains, and numerous large lumps of tissue were expelled. These, on microscopic examination, proved to be placenta in a condition of myxomatous degeneration. Patient made an uninterrupted recovery.

V. TWO CASES OF EXTRA-UTERINE GESTATION OPERATED ON AFTER RUPTURE AT THE FOURTH MONTH.

By J. HALLIDAY CROOM, M.D., F.R.C.P. Ed., F.R.S.E., Physician to the Royal Maternity Hospital; Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary; Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

So far as my personal experience is concerned, I have interfered eight times in extra-uterine pregnancy. Four of these were cases on which I operated about the third month, before the rupture of the sac, with a satisfactory result, and have been already recorded. The fifth was a case in which the operation was per-

formed while the rupture was in progress, at the third month, with recovery. The sixth was one which has already been recorded at this Society, and was one where the operation was performed at full term and after labour, the patient dying. The seventh and eighth cases, to which I wish now to specially refer, both occurred between the fourth and fifth month, and after rupture.

The record of these cases is as follows:—

On the 2nd of June of last year I was asked by Dr Macdonald of Cupar to see with him Mrs R.

The history of her case was that she had been married for two years, and had menstruated regularly till February 1894. In March there was amenorrhœa; but in April, at the time corresponding to the menstrual period, the patient had some slight discharge of blood, accompanied by severe spasms of pain in the left side. Those symptoms, with rest, gradually disappeared, and the patient seemed well again. However, from that time up till the day I saw her, she suffered from irregular hæmorrhages and pains in the abdomen, especially in the left iliac region. Dr Macdonald observed the gradual development of a tumour on the left side. Though carefully watched for, no traces of decidual membrane were observed.

On examination, the existence of a swelling on the left side, hard, yet doughy, and growing up from the pelvis to near the umbilicus, was very evident. Fluctuation could not be detected, nor could any souffle be heard over it. Per vaginam, the uterus was tilted up above the symphysis pubis, and lying behind it was a boggy swelling continuous with the abdominal mass, the whole being fixed but not specially tender. The sound entered the cavity of the uterus 3½ inches.

From the history of the case, and from the examination made, I came to the conclusion that the patient was suffering from an extra-uterine gestation growing within the broad ligament, and therefore still extra-peritoneal. The patient was removed to Edinburgh on June 11th. After examination under chloroform, I was unable to make out anything further, except that one could hear over the tumour a pulsation which very closely resembled that of a fœtal heart.

The question of operation now became urgent. As waiting until the full term offered no advantages beyond the very distant possibility of a living fœtus, and it seemed much easier to deal with a sac and placenta at this stage of development rather than at full term, I decided to operate. I opened the abdomen in the middle line, a proceeding which I now regret, as it would have been much more convenient to have made the incision over the site of the tumour. On reaching the sac wall I found it thick and vascular, and as the slightest touch with the knife caused profuse hæmorrhage, I cut through the wall with the thermo-cautery, and recognised that I had opened the sac in the site of a

portion of placenta. I found the cavity of the sac filled with blood-clot, which was carefully cleared out. I then found that,

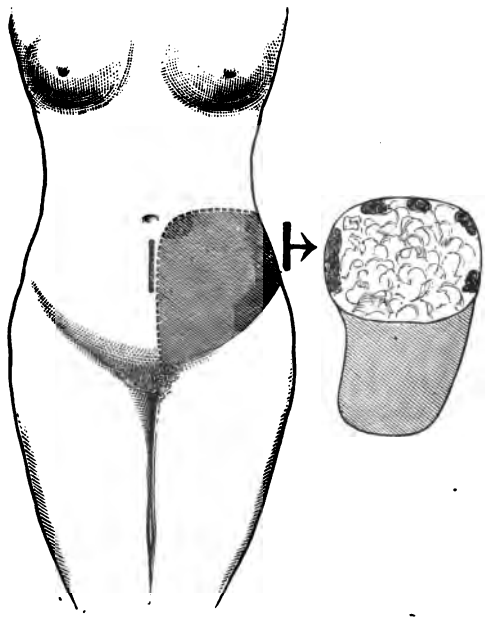


Diagram showing extent of tumour, line of incision, primary sac containing degenerated placenta, and secondary sac containing blood.

attached to the wall of the sac and near to, but not connected with, the placental mass through which I had first cut, there were five or six little masses which felt like placental tissue. These, along with the main placental mass, I removed. On subsequent examination they were shown to contain villi in various stages of degeneration. I was surprised to find no trace of either fœtus or cord, although very careful search was made for both. After some time, at the base of the sac, towards the pouch of Douglas, I discovered a small aperture through which I gently pushed my finger, and then found a second sac, probably as large as a Jaffa orange. This sac contained blood-clot only, and no trace of a fœtus could be discovered there either. Both sacs were then carefully washed out. I was very reluctant to close the operation without discovering the fœtus, but, of course, there was no alternative left. The walls of the sac were then stitched to the abdominal wall, and the cavity packed with iodoform gauze. The patient remained in a very collapsed condition for thirty hours, but gradually recovered from the shock. Two days afterwards the gauze was removed, and the cavity washed and drained in the usual way. Thereafter she made an excellent recovery.

This was evidently a case where a tubal pregnancy had, without any severe symptoms, slowly ruptured between the layers of the broad ligament. The primary sac was first opened, and the secondary sac was reached deep down in the pelvis. The question at once arises—In a pregnancy so far advanced, and with well-marked placental tissue, what became of the fœtus? Now, in a somewhat similar case which I recorded to this Society some years ago, I opened a sac equally large, and removed nothing but blood-clot. Whether that was an extra-uterine pregnancy or not, in the light of recent developments I do not profess to say. This I do know, that in that special case absolutely no trace of placental tissue could be found. It was otherwise, however, in the case before us now. In cutting through the sac wall with the thermo-cautery I passed through a mass of friable placental tissue, and detached over the interior of the sac I found smaller pieces of altered placental tissue separate and distinct from the larger mass. As to the nature of this tissue, it is sufficient to say that, after being subjected to microscopical examination, it was proved to contain villi somewhat enlarged and greatly degenerated. Some of the larger villi especially here and there were distinctly distended, and gave the appearance almost of a mucoid condition.

I had before me a very distinct recollection of a case of extra-uterine pregnancy recorded by Dr Hart to this Society, where he found no fœtus at the time of operation, but where the fœtus ultimately escaped from the gestation sac some days later on. I was therefore prepared to make a specially careful search for a fœtus, but neither in the primary sac nor in the secondary could any trace of it be found. There was no cord, and the sac wall was entire, so that the fœtus could not have escaped into the abdominal cavity. It seems to me that the explanation of this case is to be found in the altered condition of the chorion. Early, no doubt, in gestation, degeneration of the placenta had set in, probably in the direction of myxoma, and, as is well recognised in *intra*-uterine myxoma, the fœtus had perished and been absorbed.

A similar condition came within my observation in intra-uterine pregnancy some time ago. It was as follows:—The patient, 54 years of age, was sent to me suffering from uterine hæmorrhage, which had gone on for many months. It was supposed to be a uterine polypus. I found the uterus enlarged about the size of a four months' pregnancy, and after dilating the cervix expected to find a large intra-uterine polypus. In lieu of that I found the uterine cavity filled with old blood-clot and some fresh blood as well. I cleared this out, and found irregular rough masses attached to the posterior uterine wall. These were removed, not without very considerable hæmorrhage, and proved to be pieces of degenerated placenta. As in the previous case, some of the villi could be found very much enlarged and distended. No fœtus or trace of a fœtus was found, and at no time was there

any record of a fœtus having passed; and as the patient was very careful in her observations and had no reason to conceal the truth, I feel confident that nothing of the nature of a fœtus did pass.

I need not further enlarge on this case, except that it is interesting to have pregnancy occurring at 54, and that such a complication is a very rare factor in the production of hæmorrhage so long after what is usually recognised as the fertile period in a woman's life.

Of course the question naturally arises—How long had this condition lasted? And, as far as I can discover, the longest duration of a myxomatous gestation is fourteen months; so therefore in any case, as the symptoms of hæmorrhage had been present for five months, it is more than probable that the duration of the pregnancy had been eight or ten months.

Another very interesting feature in this case was, that a week afterwards large pieces of decidua were passed. Evidently the decidua had been adherent, had exfoliated, and been expelled. This, of course, is a very rare coincidence, because usually in this disease the chorion and decidua are so adherent that they come away together.

To return to the extra-uterine pregnancy we are considering. It would seem, therefore, that the condition of this extra-uterine placenta was one analogous to an early intra-uterine myxoma. No doubt I did not find the gestation sac filled with the usual vesicles, the growth and development of which would have caused an early rupture; the cause of rupture here was the accumulation of blood from the diseased placenta, and this accumulation was slow, and even when it had distended the tube the rupture was small, and the symptoms to which it gave rise were practically *nil.*

In brief, I wish to point out that in a case such as this, the failure to find a fœtus is in no way inconsistent with what occasionally happens in intra-uterine pregnancy. The chorionic villi had been abnormally developed, not to the extent as occurs in the typical myxoma, where the whole cavity is filled up by the well-known vesicles, but the nutrition of the fœtus had been so impaired by the abnormal development of the villi and the degeneration of the placenta generally, that the fœtus had perished and been absorbed.

The second case to which I wish to refer is one that presented an equally easy diagnosis, and where the result of the operation itself was more satisfactory, though the ultimate issue of the case was fatal.

The case runs as follows:—

Mrs M., æt. 32, admitted to Ward 28 on 22nd November 1894.

Complaint.—Pain in the left side, lasting for two years. During the past month this pain was very much aggravated on three occasions with symptoms of collapse continuing for a few hours.

HISTORY.—*Menstruation.*—Up till two years ago, normal and regular; since then, marked premenstrual dysmenorrhœa, and on the first and third days of the flow. Has not menstruated for the last eleven weeks.

Family.—Four children, the youngest aged three and a half years; one miscarriage between the second and third children.

Present Illness.—On the 22nd October, having missed two periods, patient lifted a heavy weight and felt "something crack" (as she said) in her left side. Two days after, severe pain set in with collapse, lasting for two hours, and this was followed by slight vaginal hæmorrhage. Subsequent to this date, before admission, she had two other similar attacks. On admission the physical examination revealed a well-defined swelling reaching 2 inches above Poupart's ligament on the left side, and on vaginal examination the uterus was felt low down, soft, and behind it, in the pouch of Douglas, an ill-defined swelling could be determined. On the 23rd November (the day after admission) patient was still in a critical condition of collapse; pulse 150, small, and temperature 96°, while the severe pain continued. However, she gradually improved, and in a day or two was very much better in every way.

On December 2nd, after the continuance for some hours of severe bearing-down pains, what proved on microscopic examination to be a decidual membrane was passed, and after this the patient seemed much relieved, and improved so much that at the end of ten days she wished to leave her bed.

On the morning of December 21st, patient collapsed again, a more or less continuous hæmorrhage going on for thirty-six hours. Pulse was almost uncountable, and, indeed, for an hour on the afternoon of the 22nd it could not be felt at all.

During her residence in hospital the tumour had gradually grown upwards to within one inch of the umbilicus; and after the attacks of December 21st and 22nd, it rose rapidly till the upper limit was 1 inch above the umbilicus.

Patient having rallied from this last attack of internal hæmorrhage and collapse, she was placed on the operating table on December 27th.

The abdominal wall was cut through slightly to the left of the middle line, when it was found that the sac wall was intimately adherent to the parietal peritoneum. On opening into the sac a large amount of blood-clot escaped, and it was then determined that the sac extended in three directions,—downwards into the pouch of Douglas, across the middle line 2 or 3 inches below the level of the umbilicus, and upwards to within 2 inches above and to the left of the umbilicus. The lower part of the sac was filled with blood-clot only, and this was shut off from the upper part by fairly strong organised tissue, probably part of the Fallopian tube forming the original sac.

The lower part having been cleared of blood-clot, I pushed my finger through the septum into the upper, and here I found a

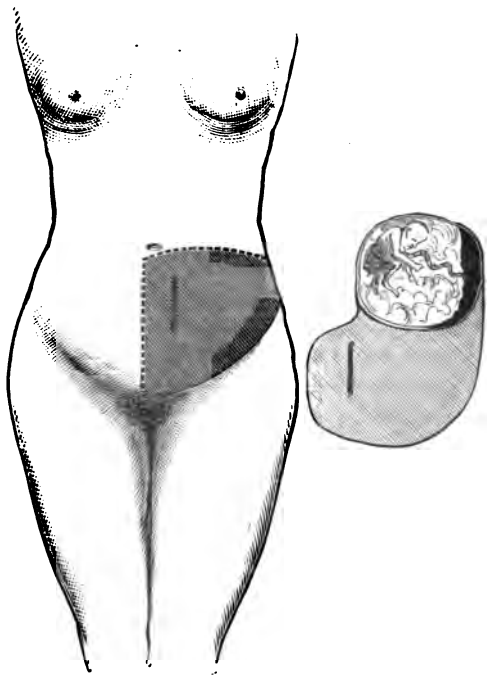


Diagram showing extent of tumour, line of incision over tumour, primary sac containing fœtus, and placenta and secondary sac containing blood-clot.

large amount of blood-clot; but besides, from the left side, I was able to remove a large amount of placental tissue, and here also I came upon the umbilical cord. On tracing this upwards, I found the fœtus, which showed no sign of decomposition, was between three and a half and four months, and was easily removed. The whole sac was then thoroughly cleared and washed out, and thereafter packed with iodoform gauze. A few stitches were used to ensure the adhesion of the sac to the abdominal wall. The whole interference was therefore entirely extra-peritoneal.

Patient did well after the operation, but still maintained the rapid pulse which had continued since the last hæmorrhage. The gauze was removed on the evening of the 28th, and the cavity thoroughly irrigated with weak corrosive solution, and a drainage-tube inserted. The washing out was continued every six hours, and everything seemed satisfactory, except the rapid condition of the pulse.

On the 29th, at 7.30 P.M., the pulse, which had been fairly

constant at 120, became irregular and intermittent. In spite of stimulants, the condition did not improve as the evening went on, and the patient died somewhat suddenly at 11.30.

Post-mortem.—Considerable hæmorrhage was found beneath the lower sac, in the pouch of Douglas, and an ante-mortem clot, several days old, was found in the right heart.

This case presents no features of special interest. It is a very characteristic case of an extra-uterine tubal pregnancy rupturing about the twelfth week between the layers of the broad ligament. There were four distinct indications at different periods of hæmorrhage and extended rupture.

In comparing the two cases, however, with regard to causation, it is very interesting to notice that the first occurred in a young woman of 27. She was a primipara, who had absolutely no indication of pelvic disturbance before her pregnancy, and the latter case had a history of two years' constant pain and premenstrual distress, so that to whatever extent desquamative salpingitis or some such lesion may account for the latter, it is extremely difficult to offer any explanation of the former.

As regards the mortality, it was just the converse of what I should have expected. In the first case the abdominal cavity was opened into before I reached the sac, and the patient remained collapsed for more than thirty hours; while in the second, the operation was entirely extra-peritoneal and the patient did well for two days, and then died somewhat suddenly, evidently from the effusion of blood into the pouch of Douglas. I shall always regret that I did not leave the iodoform gauze in longer, because I believe the continuous pressure might have prevented the hæmorrhage and saved the patient.

The President said the Fellows were greatly indebted to Dr Croom for bringing before them the two interesting cases, and he congratulated him on them both. Though the second one had an unfortunate termination, the operation was entirely successful, and the result showed the necessity of leaving in the packing as long as possible. In this case, it was removed in about thirty-six hours; but the result showed that it would be wiser to leave it for three or four days. Dr Croom was right in emphasizing the importance of the lateral incision, so as to reach the sac without opening into the peritoneal cavity. He did not think there was sufficient evidence that the first case was a myxoma. Where the placenta was destroyed at an early period by hæmorrhages, the fœtus might be absorbed; and changes in the placenta after the death of the fœtus have been described which produce an increase in the size of the tumour.

Dr Haultain thanked Dr Croom for his very interesting and practical paper. A question of very considerable practical importance, and one which he had by no means yet come to a

definite conclusion upon, was—What was the correct treatment in cases of extra-uterine gestation after the fourth month? Should one operate at once, or allow the gestation to proceed till the full time? From the eminently satisfactory results recently attained in the treatment of full-time extra-uterine gestation, he thought if no urgent symptoms demanded immediate operation, he would, under the circumstances, delay operating till a living child could be got, as the operation at full time presented few, if any, more risks than at the fifth month. He need hardly say that if diagnosed in the early months operation was absolutely demanded, as the risks from rupture of the sac were so great; but after the period of rupture, when no urgent symptoms were present, he felt the correct thing to do was to keep the case under close observation till the viability of the fœtus was assured, when the operation could be undertaken. He had seen several cases operated on both at full time and at the fifth month when no urgent symptoms were present, and as far as he could, as a spectator or assistant, see, the operation at full time was more simple than when earlier performed.

Dr Webster asked why Dr Croom had not operated sooner in the second case?

Dr Halliday Croom, in reply, said that he was quite in accord with the criticism of the President—namely, that he had not entirely proved his case as being one of genuine myxoma. With this special point he was not particularly concerned. All he wanted to prove was that the placenta was in separate lobes and so seriously degenerated that the fœtus had perished early in pregnancy, and, further, that he had an independent microscopical report on that point. So far as he knew, the condition was almost unique as establishing the possibility of the presence of genuine placental tissue without a fœtus. In reply to Dr Haultain, he said that he thought, from his past experience, it was easier to deal with a comparatively small sac at the fourth month than with a full-term fœtus and placenta, and, further, the chances of a living child were small and the interests of the mother paramount. He thanked Dr Milne Murray for pointing out that the rapid growth of the sac was consistent with the suggestion of myxoma. Dr Webster had asked why he (Dr Croom) did not operate when the patient was admitted, and his answer was, that the diagnosis was not certain, and the patient was so collapsed he considered it better to wait till she rallied.

VI. NOTE ON METHODS OF ARTIFICIAL RESPIRATION IN THE NEW-BORN.

By R. C. Buist, M.D., Dundee.

In a busy general practice occasions of applying respiratory stimulus to the new-born are somewhat numerous, and as in most

cases they succeed easily, no note of their occurrence is made; but experiences so dramatic as those I met on first attempting to use Schultze's method leave an indelible record on the memory.

Standing in a well-cleared space in the midst of a small room, whose other denizens were withdrawn into the corners, my feet planted well apart and arms extended, I taught the neonatus to perform a series of grand circles, while the meconium distributed itself in trajectories for which the room and its inmates, including the physician, formed a comprehensive recording surface. Another like experience reduced my traditional devotion to Schultze's method, until I found that all its characteristic advantages can be got in a less impressive way, of which, however, the onlookers cannot relate, that "The bairn was so bad 'at the doctor had to throw't o'er his head."

By most authors—except, perhaps, Barnes—Schultze's method is accepted as one of the best and most rapidly effective; but where the meconium has not previously been ejected it is an uncomfortable method for the physician, and it is sometimes too violent for the child. Runge records (*Charité Ann.*, 1882), "Hæmorrhages in Lung and Pleura and in Adrenals;" Winter (*Deutsch. Med. Woch.*, 1888, 575), "Blood in Peritoneum, Fracture of Rib, Rupture of Liver, and Dislocation of Spleen (enlarged);" Kehrer (*Lehrb. d. op. Geburtsh.*, p. 145), "Danger when the Neck has been Stretched;" Ahlfeld had a sudden death while demonstrating the method to his students; Gebhard (*Zeits. f. Geburtsh. u. Gynäk.*, 1894, Bd. xxx. 2) attributes a traumatic hæmothorax from rupture of an intercostal vein to this method; and in my own practice I have seen a fractured clavicle, which the friend who officiated for me at the delivery attributed to the same cause. I have, therefore, reviewed the various methods that have been described, and compared them with the plan which I had already adopted and found successful, and as this latter seems to have several points of advantage, I shall submit the details for your consideration.

The methods of artificial respiration consist of selections from a series of manœuvres which I have tabulated:—

MANŒUVRES OF ARTIFICIAL RESPIRATION.

Expiratory.

A.—Compression of thorax—

a. By weight of trunk of fœtus. Hall.

β. By physician—(1.) Direct manual compression. Howard, Duke, Prochownik.

(2.) Indirect compression through child's arms. Silvester (as commonly applied).

(3.) Resisting movement of child's body. Schultze.

B.—Flexion of trunk of fœtus. Byrd, Schroeder, Dew, Schultze.

C.—Elastic recoil of thorax after distention (wall and organs). Bain, Pacini; Silvester (as described by himself).

Inspiratory.

A.—Raising the thorax wall—

α. Pull of the pectoral muscles. Silvester.
By weight of child's arms. Byrd.

β. Pull of all shoulder muscles. Bain, Pacini (Silvester).

B.—Depression of diaphragm by throwing down abdominal contents—

α. By their weight. Byrd, Dew, Schultze.

β. By movement (centrifugal). Schultze.

C.—Elastic recoil of thorax (wall) after compression. Hall, Howard, Duke, Prochownik.

As will be seen from the table, the elastic recoil of the thorax wall or contents, which cannot, of course, be excluded from any method, is by several authors relied upon for the second movement. Thus Hall, Howard, and Duke provide only expiratory movements; Bain and Pacini only inspiratory. In applying any method several necessary points must be attended to:—(1.) To allow mucus, liquor amnii, or other foreign matters to escape from the respiratory passages,—that is, over and above what can be mechanically removed from the pharynx. This is met by a dependent position of the head, especially adopted by Howard, Duke, Dew, and Prochownik, and neglected by the other authors. (2.) To avoid chilling the child, which in most cases necessitates the interruption of the method by the immersion of the body in warm water. The methods of Howard, Silvester, Bain, and Pacini might be carried on while the trunk is immersed, and Dew says that this is possible with his method also, but as he figures the child with its head below the rest of the body, I do not understand his claim. (3.) Duke, in describing his method, says he waits till the cord has almost stopped pulsating, and then divides it; but as in an asphyxiated child this is more likely to occur from failure of the heart than by diversion of the umbilical circulation, the direction seems erroneous, and only likely to add the difficulty of re-starting the circulation to that of the respiration. The few minutes during which the physician usually grasps the fundus uteri with one hand and applies the other to various parts of the child suffice to drain the placental circulation so far as it can be usefully done, and it seems inadvisable to wait till the cord stops pulsating.

The method I use is as follows:—Should stimulation of the buttocks or chest wall fail to elicit a vocal response, I clear the pharynx and detach the child, and then place it face downwards on the palm of my right hand with the head away from me. The

upper and lower parts of the body and the limbs are thus dependent over the edges of the hand. I then roll the child over, and at the same time transfer it with a slight throw to my left hand in the dorsal position, the legs and arms being again dependent. It is then re-transferred to the right hand in the first position, and the whole movement is repeated twelve to sixteen times a minute. Should there be any fear of chilling the child, the whole process may be carried out while the lower part of the body is immersed in a basin of warm water in front of the fire.

To test the efficiency of this method, I took a cat poisoned with chloroform, inserted a cannula in its trachea, and connected it with a Marey's tambour, writing on a revolving cylinder. The tracing had this character:—Starting in the expiratory position about two-thirds up the field, during the transfer to my left hand there is first a deeper expiration, followed by a sweep of inspiratory curve right across the field. The simple curve of re-transfer restores the first position. I shall now draw your attention to the features of this method in detail for the purpose of comparison:—

A.—Starting in the expiratory position, (1) the weight of the trunk (Hall), and (2) its flexion (Byrd) compress the chest, and (3) favour the expulsion of mucus, etc., for which (4) the slight hang of the head is advantageous.

B.—Expiration is deepened at the beginning of transfer, probably by the pressure of the fingers of the right hand (Howard).

C.—The quick roll over to the dorsal position (1) throws up the shoulders and arms, and (2) pulls up the thorax wall (Silvester); (3) the fall of the legs and pelvis (4) throws down the abdominal contents, and (5) depresses the diaphragm (Schultze), and during the inspiratory movement (6) the upper air tract is almost straight.

D.—As Duke pointed out, when the child lies on the right hand as described, (1) the finger tips cover the cardiac region, and (2) any change in the heart beats can be noted without delay, and (3) without interrupting the movements, as Duke does.

E.—It is easy to avoid chilling the child.

It would seem, then, that the method avoids the violence, the risk of chilling, and the discomfort to the physician involved in Schultze's method, without sacrificing its peculiar feature, depression of the diaphragm, which it supplements by the most effective features of the other methods in a very simple and apparently effective way.

I have not entered into the debatable question of the general advantage of mechanical methods of artificial respiration, but assuming that mechanical methods are of use, I shall be pleased if

my notes induce a discussion on the limitations of Schultze's method, and if I have suggested an easy and effectual substitute.

Dr Halliday Croom had listened to Dr Buist's paper with much pleasure. He thought he had established a very good claim for his method, and that he had established it on a very scientific basis. At the same time he did not think the advantage of one method over another was so great as to make any one paramount. His own opinion was that it was not so much the method as the persistent perseverance with which any special system was carried out.

Dr Kynoch had listened with interest to Dr Buist's paper. With reference to fractures of the clavicle and other injuries produced by Schultze's method which Dr Buist had mentioned as an objection to it, he thought that such injuries were in most cases produced when the method had been roughly carried out. He considered it quite possible that the fractures of the clavicle attributed to Schultze's method might be caused by the operative interference required during the birth of the child, and that those injuries being noticed for the first time after Schultze's method had been carried out, were wrongly attributed to the latter. Experiments had been made on dead children to show what injuries, especially of the chest, might be produced by this method, but he thought that a greater amount of violence might be used in the carrying out of such experiments than one would be justified in adopting in the case of an asphyxiated child.

The President thanked Dr Buist for his interesting communication. He agreed with Dr Kynoch that the danger of Schultze's method to the child were not great, and he had found it very efficient. In a case recently he had brought round a child after an hour and a quarter of artificial respiration by this method, the only respiratory effort on the part of the child being a spasm of the diaphragm after fifty minutes. At the same time, there were certain inconveniences in Schultze's method which Dr Buist had drawn attention to, and which made his own method well worthy of trial.

Dr Haig Ferguson congratulated Dr Buist on his interesting paper. So far as he could understand his description, Dr Buist's method seemed to be not unlike Marshall Hall's. It appeared, however, to be more effective than Marshall Hall's, and to possess all the advantages Dr Buist claimed for it. Personally Dr Ferguson seldom used Schultze's method, as he generally found compression of the thorax, along with mouth-to-mouth insufflation (if perseveringly continued), a much more satisfactory procedure. Dr Ferguson thought that no discussion on artificial respiration would be complete if this method were not referred to. His method of procedure was as follows:—See that the upper air-passages are thoroughly clear, and, if necessary, hold the child head downwards for a few seconds, to drain off any

contained fluid. After cleansing the face, spread a fine cambric handkerchief over it, close the child's nostrils with one hand, and press the other hand firmly over the abdomen, so as to prevent air being blown into the stomach. Then apply the mouth over the child's mouth, and gently force air into its lungs through the handkerchief, at intervals of about twenty times a minute, the thorax being gently and intermittently compressed between times. Dr Ferguson had found this method successful when all else had apparently failed. It was, of course, important to see that the child be kept warm during the more or less prolonged manipulations.

Dr Cullen was glad to welcome the simple method so ably demonstrated by Dr Buist. He was himself, however, strongly of opinion that the simplest and most effectual method of artificial respiration was that of mouth-to-mouth insufflation. By gently pressing backwards the larynx there was little chance of the air passing into the stomach. He had seen this method rapidly resuscitate children upon whom other methods had absolutely no influence. There was no doubt that Dr Halliday Croom had sounded the most important note with regard to the different means of artificial respiration in emphasizing the necessity for prolonged efforts in every case. This fact was specially forced on Dr Cullen's attention by two cases. In one the normal respiration returned only after an hour's effort. In the other, after continuing mouth-to-mouth insufflation for an hour and a half, the heart-beats became inaudible, and the child was given up as dead. On its removal to another room, a slight spasmodic movement was noticed, and artificial respiration was commenced anew. Within three-quarters of an hour the infant was breathing fairly well, and ultimately completely recovered.

Dr Haultain thoroughly agreed with the previous speaker that attempts at resuscitation should be kept up for a prolonged period, but the question was, When was one to stop, if ever? It had been suggested that so long as the heart beats so long must one continue. Although this was the rule, still, like all others, it had its exception, as the following personal experience, he thought, proved. With two other practitioners, they kept the fœtal heart beating by artificial respiration for two and a quarter hours. Not one attempt at spontaneous inspiration, however, occurred. At the request of the friends, they then desisted. This was fortunate, as they might still have been at it, the post-mortem showing a basal intra-cranial hæmorrhage, which evidently had destroyed the respiratory centre without affecting the circulatory.

Dr Buist replied.

VII. *Dr Barbour* read a paper on A STUDY OF THE MORE RECENT FROZEN SECTIONS IN THEIR BEARING ON THE MECHANISM OF LABOUR AND THE THIRD STAGE, to be continued and discussed at next meeting.

VIII. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL FOR PROFESSOR SIMPSON'S QUARTER, ENDING 31ST JANUARY 1895.

STATISTICS OF INTERN CASES.

DURING the quarter there were 78 cases of labour. In addition, 3 patients were admitted for treatment post-partum.

Of the 78 patients, 38 were primiparæ, 40 multiparæ. The labours are classified as follows:—Natural, 43; laborious, 24; preternatural, 3; complex, 3; abortions, 5.

Of the cases admitted for treatment post-partum, 1 was for natural puerperium, 1 for eclampsia, 1 for rupture of the uterus.

The mortality was:—Maternal, 1 (eclampsia); infantile, 1; fœtal, 4 (all in cases of small or deformed pelves).

Sex of viable children:—Male, 28; female, 45.

General Note on Intern Cases.

The presentations were 68 cephalic, 4 pelvic, 1 transverse. Of the cephalic cases 59 were vertex L.O.A., 1 vertex R.O.A., 8 vertex R.O.P. Of these last, 4 ended as persistent occipito-posterior, and 4 required interference to effect or complete rotation.

The pelvic cases were 2 breech L.S.A. (cases of eclampsia at seventh and eighth month), 1 breech R.S.A. (in induction at eighth month), and 1 R.S.A. footling.

The single transverse case was L.A.A., with prolapse of arm in a patient with deformed pelvis.

The complex cases delivered in Hospital were two cases of eclampsia and one of lateral placenta prævia. There was a complete absence of severe hæmorrhage cases during the quarter.

The abortions presented no special feature. There were 2 at fourth month, 2 at fifth, and 1 at sixth. In 3 of these cases there were evidences of syphilis, and in 1 a history of accident.

REPORT ON EXTERN CASES.

Numbers.—The number of women attended in their own homes was 145. Of these, 28 were primiparæ, 117 multiparæ.

Labours.—The labours are classified as—Natural 120, laborious 11, præternatural 6, complex 3, abortions 5; total, 145.

Mortality.—Maternal 0, infantile 2, fœtal 15.

Sex.—Sex of children that were viable:—Male 71, female 69; total, 140.

The eleven laborious labours included six cases of R.O.P. In one of the six long rotation occurred unaided. In two the pelvis was flat, and, high forceps being applied, the occiput came to the front. The other three became cases of persistent occipito-posterior, and were terminated with the aid of forceps. There was one face case—R.M.P.

The præternatural labours were all breech cases.

There was one case of eclampsia, which was removed to the Hospital. Two cases were complicated by hydramnios.

Three of the five abortions were directly attributable to syphilis.

General Note on Extern Cases.

The entire absence of cases of hæmorrhage is the only notable feature of the quarter's work. The cases of special interest are grouped along with those which occurred in the intern work.

Three Cases of Eclampsia and one of Albuminuria.

1. Mrs A., æt. 43, v-para, admitted Nov. 28th, 9.55 P.M. Condition on admission briefly as follows:—Patient unconscious; no obvious œdema; conjunctival and pupillary reflexes absent; breath foul, but not urinous; tongue severely bitten; breathing stertorous, 28 per min.; pulse irregular, 87; urine with copious amount of albumen; history of five spasmodic attacks since 5.30 P.M. Patient found to be eight months pregnant; os admitted two fingers easily. No previous history of eclampsia, Bright's disease, epilepsy, or alcoholism. There had been prodromata of occipital headache, giddiness, vomiting, attacks of blindness.

Treatment was croton oil and glycerine by mouth, chloral and bromide per rectum, vapour bath and chloroform for two subsequent seizures. At 11.30 patient was seen by Dr Barbour, who determined to empty uterus as soon as possible. Cervix dilated by Barnes's bags in thirty-five minutes, and fœtus thereafter delivered by version alive. Patient was very restless all night, and the following morning was almost maniacal. This excitation passed off in twenty-four hours, and patient made a good recovery. The urine showed marked progressive diminution in quantity of albumen, viz.:—

1. On admission, 4 grammes per litre.
2. Morning after delivery, 2 „ „
3. Night „ „ $\frac{1}{3}$ „ „
4. Second morning, trace.
5. Second night, faint trace.

No blood or tube-casts found in any specimen.

2. Mary R., i-para, æt. 21, admitted Jan. 7th, 8 A.M. Patient was seven months pregnant; seven attacks prior to admission, and two shortly after. Little œdema; profound coma between seizures; urine had 7 grammes per litre of albumen. Os was perfectly intact, and no sign of labour setting in. Professor Simpson saw patient, and advised immediate dilatation with a view to early delivery. Dilatation began at 12 noon with Hegar's dilators. Nos. 1 to 20 were passed in succession, followed by Barnes's bags. The largest bag was left *in situ* for an hour. Dilatation was complete at

3.50 P.M., and fœtus, which presented by the breech, delivered at once alive without difficulty.

After labour patient's condition remained unaltered, and she had two spasmodic seizures at 4.35 P.M. and 5.15 P.M. At 5.30 P.M. she was put into a hot vapour bath for two hours, and profuse perspiration ensued. No further fits. Urine at night still showed 7 grammes per litre of albumen. Patient conscious on following morning, and thereafter made a good recovery. The albumen diminished daily to 5, 3½ grammes per litre, and disappeared on the sixth day.

The infant, which weighed 2 lbs. 4 oz., and measured 13½ ins. in length, was kept in the incubator for three weeks, latterly spending the day with the mother.

3. Mrs C., æt. 21, i-para; admitted Jan. 18th, at 2 P.M. Patient had been seen at her own home in the morning. There was history of three fits, and labour was completed at once by forceps, head of fœtus being on perineum when seen. Patient left quite conscious and apparently well at 7.30 A.M. Seizures occurred in forenoon, and patient brought into hospital. In spite of vigorous treatment, including a two hours' vapour bath, fits continued, and at 8.40 P.M. she had had eleven. Pulse got very weak, rapid (140-160), and frequently intermitted. Stimulant treatment by brandy and digitalis was persevered with, but cardiac condition did not improve, and patient died suddenly thirty hours after admission. Patient's condition was all along too critical to admit of careful physical examination of chest, but there is reason to believe that patient had a double mitral lesion. No post-mortem allowed. There was free hæmorrhage during the third stage, which probably accounts for the very marked temporary improvement after delivery. The urine showed 5 grammes per litre of albumen. No casts.

4. Sarah E., æt. 23, i-para; admitted Nov. 27th, at noon. Patient had been in labour four hours, and os was found to be the size of a shilling. There was great œdema, especially of lower limbs. No convulsions. Urine, on boiling, contained three-fourths of albumen. Os was fully dilated without interference three hours later, and labour hastened by forceps. The same evening the œdema was less, and the urine, on boiling, contained half its bulk of albumen. Pulse softer, and second sound less accentuated. Albumen and œdema gradually and simultaneously disappeared within a week. Patient made a good recovery, and was dismissed on the tenth day.

Two Cases of Premature Induction of Labour by means of the Champetier de Ribes's Bag.

1. Mrs S., æt. 38, xii-para; eight months pregnant. Patient's first six labours normal; seventh tedious; eighth pregnancy ending in an abortion at fourth month; ninth and tenth, dead children delivered with great difficulty by forceps; eleventh, terminated at

eighth month by induction (Dr Webster), child living only two and a half days. Physical examination showed usual multiparous characters. External pelvic measurements normal. On vaginal examination there was found osseous thickening of descending rami of pubes on both sides. The ischial spines were unduly prominent, and pressure on them elicited pain. Ischial tuberosities approximated, and transverse diameter of outlet was found to be $3\frac{1}{8}$ ins.

After preparatory douches, dilatation of cervix was begun at 10 A.M. on January 16th. Hegar's 29 and 30 were introduced, and after some digital dilatation the *de Ribes's* bag was inserted and filled with 1 to 60 carbolic. Patient thereafter allowed to go about ward for rest of day. Pains began at 3.30 P.M. At midnight the *de Ribes's* bag found to be in vagina, and dilatation complete. Presentation made out as breech R.S.A.

At 4 A.M. breech still at brim, so a leg was pulled down and delivery completed. Some difficulty with shoulders at outlet. Cord was pulseless on delivery, but infant resuscitated after twelve minutes' artificial respiration. It weighed 6 lbs., and was $17\frac{1}{2}$ ins. in length. The head measurements were—O.M. $4\frac{7}{8}$ ins., O.F. $4\frac{3}{8}$ ins., S.O.B. $3\frac{5}{8}$ ins., B.P. $3\frac{1}{2}$ ins., B.T. 3 ins.

2. Kate W., æt. 21, ii-para. Last menstruation early in June 1894. Delivery on first occasion after cranioclasm on March 23rd, 1894. Patient's height is 4 ft. $5\frac{3}{8}$ ins., and pelvis is markedly justo-minor. The measurements are—Interspinous diameter, 8 ins.; intercristal, 9 ins.; ext. conj., $6\frac{3}{8}$ ins.; diag., $3\frac{3}{4}$ ins.; true, $3\frac{1}{4}$ ins.

After preparatory douching, combined with use of iodoform pessary and glycerine plug, *de Ribes's* bag inserted at 12 noon on January 29th. At 8.15 P.M. bag removed, dilatation being almost complete, but no uterine contraction. Following morning, in *statu quo*, and *de Ribes's* bag placed in vagina to stimulate uterine contractions. At 10.10 P.M. on 30th, membranes ruptured artificially, and forceps applied above the brim, as head refused to engage. After about an hour's very difficult traction fœtus was delivered. The heart beat slowly for a short time, but attempts at resuscitation were unsuccessful. The fœtus weighed 5 lbs., and was 18 ins. long. The head measurements were—O.M. 5 ins., O.F. $4\frac{3}{8}$ ins., S.O.B. $3\frac{1}{2}$ ins., B.P. 3 ins., B.T. $2\frac{3}{4}$ ins.

Note of Case where de Ribes's Bag proved of value after Premature Rupture of Membranes.

Mrs A., æt. 36, vii-para, admitted January 30th, at 12 noon. Pains began at 10 A.M. that morning, and membranes ruptured immediately thereafter. On admission, os the size of a shilling, head presenting, lying L.O.A., but high. At 8.15 P.M. os only the size of a florin. At 5 A.M. no further progress, and as head seemed too large to engage and dilate in place of the lost forewaters, the *de*

Ribes's bag was inserted. At 9.45 A.M. bag found in vagina and dilatation complete, but head still above brim. Forceps were then applied and head pulled through bony pelvis with patient in Walcher's position. The child, a healthy male, weighed 9 lbs. 5 oz., and the head measurements were—O.M. 5⅝ ins., O.F. 5 ins., S.O.B. 4 ins., Bi-P. 3¾ ins., Bi-T. 3¼ ins. The length was 20½ ins.

Eight Cases of Contracted Pelvis.

Three, small pelves—projecting promontory; 2, projecting promontory; 2, justo-minor; 1, narrow outlet. Four of the above were delivered by forceps.

1. *Extern.*—Mrs C., v-para, æt. 25. Small pelvis—promontory projecting. The first and second children were delivered still-born by forceps. The third and fourth were delivered alive by Drs Milne Murray and Croom respectively, forceps being used.

On Nov. 13th the patient was found with os dilated and membranes ruptured. The head presented; occiput to the right, brow dipping; not engaged. I.S. 8½ ins., I.C. 9½ ins., ext. conj. 6½ ins., diag. conj. 4 ins., true conj. 3¼ ins.

High forceps; living child at full time; Walcher's position was used.

2. *Intern.*—I. B., primipara, æt. 19. Small pelvis—promontory projecting. I.S. 8½ ins., I.C. 9½ ins., ext. conj. 7 ins., diag. conj. 3⅞ ins., true conj. 3¼ ins. Labour, Nov. 21st; vertex L.O.A.; forceps; dead child. Walcher's position was used.

3. *Extern.*—Mrs D., vii-para, æt. 33. Projecting promontory. The six previous labours were instrumental. Labour, Dec. 25th; os dilated; head presenting; occiput to the right; brow low. I.S. 9 ins., I.C. 10 ins., ext. conj. 7 ins., diag. conj. 4 ins., true conj. 3½ ins. Forceps; living child; Walcher's position.

4. *Intern.*—A. H., primipara, æt. 20. Slight justo-minor. I.S. 8¾ ins., I.C. 9½ ins., ext. conj. 7½ ins., diag. conj. 4 ins., true conj. 3½ ins. Jan. 9th, 1895, labour; forceps; living child; Walcher's position.

Two cases required embryulcia, viz.:—

5. *Intern.*—E. J., primipara, æt. 22. Slight justo-minor—promontory projecting. I.S. 9¼ ins., I.C. 10¼ ins., ext. conj. 7 ins., diag. conj. 4 ins., true conj. 3¼–3½ ins.

Nov. 14th.—Labour began; membranes ruptured.

Nov. 15th.—Slow dilatation going on.

Nov. 16th.—Dilatation complete; embryulcia. First stage, 72 hrs.; second stage, 4 hrs. 45 mins.; third stage, 5 mins.; total, 76 hrs. 50 mins. Vertex L.O.A.; forceps tried; cord prolapsed in grip of forceps; perforation; extraction with cranioclast.

6. *Extern.*—Mrs M., x-para, æt. 35. Projecting promontory.

I.S. 10 ins., I.C. 11 ins., ext. conj. 7½ ins., diag. conj. 4 ins., true conj. 3½ ins.

Jan. 30th.—Labour, lasting 18 hrs. 50 mins.; forceps repeatedly applied, after which perforation and extraction by cranioclast.

7 and 8 are described under the heading "Induction of Premature Labour."

Case of Transverse Presentation in a Pelvis deformed by Hip-Joint Disease.

B. B., primipara, æt. 20. At four years old patient began to suffer from tubercular disease of the right hip-joint. She had seven months of operative and other treatment in the Edinburgh Royal Infirmary. There are several scars, and one sinus still discharging. The great trochanter is the chief seat of disease. The pelvis dips to the right, the anterior and posterior superior spines being ½ in. lower on the right side. The right leg is abducted, and measurement from symphysis pubis to inner malleolus is 1½ ins. greater on right than on left. On internal examination the capacity of the pelvis was found to be much reduced on the left side, the right side being fairly roomy. I.S. 9 ins., I.C. 10 ins., inter troch. 12 ins., ext. conj. 7 ins., diag. conj. 4¼ ins., true conj. 3¾ ins.

Pains began at 2 P.M. on Dec. 7th, 1895, the patient being at full term. At 6.35 P.M. the os was fully dilated, and an elongated tense bag of membranes filled the vagina. Within this the right hand was found, the presentation being transverse, position L.O.A. During an attempt at bipolar version the membranes were ruptured, and podalic version was completed by the internal method.

Pulsation having ceased in the cord, it was found that the head was jammed in the contracted brim. Forceps were applied to the after-coming head, and the labour ended at 6.55. The child was not resuscitated.

Case of Incomplete Rupture of the Uterus.

Mrs L., xiv-para, æt. 37. Only six of fourteen pregnancies went on to full time; three children living.

On Jan. 29th, being six months pregnant, she fell while out walking. Pains began at once, about noon. The membranes ruptured at 5 A.M. on Jan. 30th. The medical attendant found dilatation complete and both arms prolapsed at about 2 P.M. He turned, and delivered the fœtus without difficulty. While removing the placenta, which was adherent, he found a rent in the wall of the uterus on the left side, extending from the cervix up to the ring of contraction. She was admitted to Hospital about 4.30 P.M., when it was found that the peritoneum was uninjured, the tear having run into the left broad ligament. After careful douching, the tear and the vagina were packed, not tightly, with iodoform gauze. The packing was removed on the fourth day, and was not replaced.

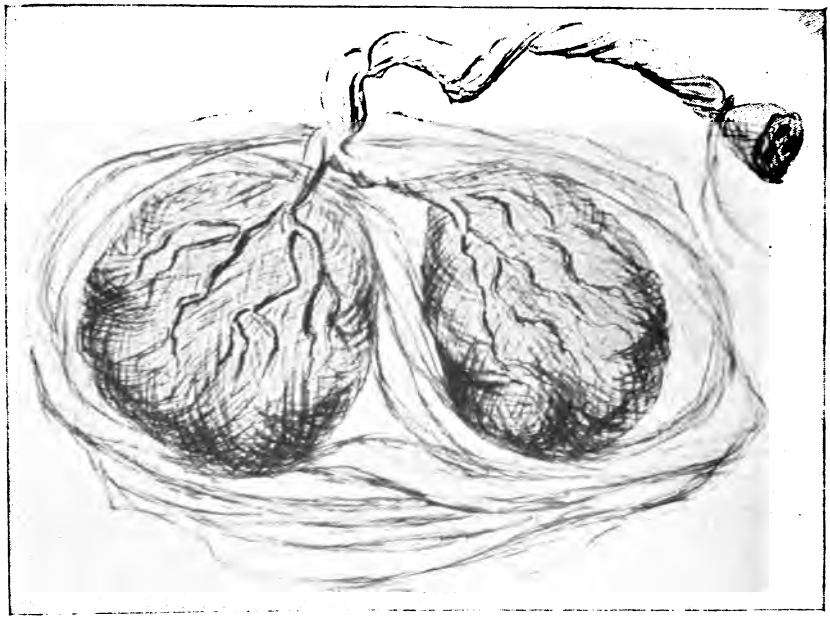
Two douches daily were then given. The catheter was used for seven days, and the rectum was frequently washed out. Beyond this and medicinal treatment of a very defective circulation nothing was needed. As the patient gradually recovered from her collapsed condition the pulse fell from 130 to 82, and the temperature from 101° to normal. After fourteen days she was nearly as well as an ordinary puerperal case.

MEETING V.—MARCH 13, 1895.

DR A. H. FREELAND BARBOUR, *President, in the Chair.*

I. John Struthers, M.B., C.M., South Africa, was elected an Ordinary Fellow of the Society.

II. *Dr James Ritchie* showed a DOUBLE PLACENTA—sometimes called DIMIDIATE or BILOBATE. From its position in the sac of membranes it had been attached high up in the uterus. The two lobes were nearly equal in size—the larger circular, 15 cms. in diameter; the smaller oval, 11 × 14 cms. The lobes were about 4 cms. apart from each other. The cord, a very short one, 36 cms. (14 inches), had a velamentous insertion 6 cms. distant from the



smaller lobe, and 3 cms. from the larger one. The child was large, and weighed 5·68 kilogrammes (12½ lbs.). In consequence of the

shortness of the cord there was some difficulty in applying the ligatures. When Dr Ritchie found what seemed to be two placentas he thought of a twin conception, but neither flattened fœtus nor second cord was present; and further investigation showed that the cord sent nearly equal branches to the two lobes. Dr Ballantyne had given Dr Ritchie a reference to a similar specimen, which is figured in the *Trans. Obstet. Soc. London*, vol. viii. p. 338. There was much resemblance between that specimen and the one now shown. The London one must have had the lower portions of the lobes in apposition, and the cord was implanted into the apposed margins. In the specimen shown to the Edinburgh Obstetrical Society the lobes were separated by a portion of membrane 1½ inch broad, and the insertion of the cord was velamentous near the upper portions of the lobes.

III. *Dr J. W. Ballantyne* showed a FROZEN SECTION OF A FEMALE FŒTUS, with anencephaly, a localised spina-bifida in the lumbar region, talipes calcaneus, and a malformed right thumb. It was the sister of a fœtus which he had shown the Society about eighteen months ago, in which there was hydrocephalus and no right thumb and radius. Dr Lundie, who had given him both specimens, had told him that the mother had no ball of the thumb on either side, with want of power of opposition, whilst her sister showed the defect on one side. In addition to the above deformities, the fœtus showed an amniotic band stretching from the spina-bifida to the membranes. The case was extremely interesting from the point of view of heredity, and the fact that one fœtus was hydrocephalic and the other anencephalic had a bearing upon the supposed mode of origin of the latter monstrosity.

He also showed, for *Prof. Simpson*, an ANENCEPHALIC FŒTUS.

IV. A STUDY OF THE MORE RECENT FROZEN SECTIONS IN THEIR BEARING ON THE MECHANISM OF LABOUR AND THE THIRD STAGE.

By A. H. Freeland Barbour, M.D., F.R.C.P. Ed.

During the last five years the Sectional Anatomy of Labour has been enriched by many important contributions, showing in various countries an extraordinary activity of research in this department. France has produced the handsome *Atlas of Studies in Obstetric Anatomy* by Pinard and Varnier, with ninety Plates and illustrations of various kinds, and containing numerous Sections from the earlier and later months of Pregnancy, from Labour, and from Extra-uterine Gestation; and also the *Atlas* of Testut and Blanc, with six Plates from a case of commencing Labour in the sixth month. From Italy we have Pestalozza's valuable Sections from Pregnancy, commencing Labour, and the

Third Stage; and Tibone's interesting case of Placenta Prævia. Germany has produced the very complete series of Sections from a case of full-time Pregnancy by Braune and Zweifel; which has been followed since by Zweifel's unique cases from the Second Stage with the child partially born,—of especial value as showing the genital tract throughout. From Poland has come Von Mars' remarkable Section from a case of Double Rupture of the Uterus in a patient in whom labour was apparently progressing normally. In addition to the Sections from Pregnancy and Labour published in the *Laboratory Reports of the Royal College of Physicians*, Webster has made a most important contribution to our knowledge of the Puerperium in his *Researches into Female Pelvic Anatomy*,—a book beyond all praise for the beauty and finish of its illustrations and the exactness of its anatomical descriptions.

Altogether there have been published twenty-three Sections which throw light on the Anatomy of Labour. I have designedly omitted from this list Sections from the earlier period of Pregnancy,—such as the artistic *Atlas* of Soffiantini,[1] descriptive of a sixth month's pregnancy; Webster's[2] Section of a fifth month's Pregnancy; Waldeyer's[3] Plates of an early Pregnancy; and Pestalozza's[4] case from the sixth month.

We tabulate the twenty-three cases, with the cause of death, as follows:—

Pregnancy.—Seven and a half months, Pinard and Varnier;[5] eclampsia.
Eighth month, Barbour and Webster;[6] pulmonary phthisis.
„ „ Pinard and Varnier;[5] eclampsia.
Ninth „ Braune and Zweifel;[7] heart failure.

Labour—First Stage.—At full time, Barbour and Webster;[6] pulmonary phthisis.
At sixth month, Testut and Blanc;[8] eclampsia. (Membranes ruptured.)
At full time, Pestalozza;[4] (not mentioned).
(Os dilated to ½ in. by 1½ in., and membranes separated antero-posteriorly 4 in.)
At eighth month, Pinard and Varnier;[5] eclampsia.
(Os internum dilated to 2½ in. and cervix taken up, membranes being free to a few mm. above the os internum.)
At full time, Tibone;[9] placenta prævia.

Second Stage.—Head on perineum, Barbour and Webster;[6] heart failure.
Child turned and leg pulled down, not

extracted, Zweifel;[10] hæmorrhage from placenta prævia.

Head born but uterus ruptured, Zweifel;[10] eclampsia and rupture of uterus.

Head on perineum, with longitudinal and transverse ruptures of uterus, Von Mars;[11] hæmorrhage from rupture of uterus.

Third Stage.—Placenta unseparated, Pestalozza;[4] pulmonary œdema.

Placenta of twins unseparated, Pestalozza;[4] asphyxia from goitre.

Placenta from triplets unseparated, Pinard and Varnier;[5] heart failure.

Placenta in course of expulsion, Pinard and Varnier;[5] rupture of uterus.

After Delivery.—Immediately, Barbour and Webster;[6] heart disease.

Second day of puerperium, Webster;[2] eclampsia.

Third day of puerperium, Webster;[2] acute yellow atrophy.

Fourth day of puerperium, Webster;[2] Bright's disease.

Sixth day of puerperium, Webster;[2] acute lobar pneumonia.

Fifteenth day of puerperium, Webster;[2] heart disease.

It is interesting to note what the patients died of, as indicating the most frequent causes of sudden death in connexion with

[1] Soffiantini, Giuseppe.—*Sezione Mediana Verticale, etc.:* Ulrico Hæpli, Milano, 1891.

[2] Webster, J. Clarence.—*Researches in Female Pelvic Anatomy:* Young J. Pentland, Edinburgh and London, 1892.

[3] Waldeyer, W.—*Die Lage der Weiblichen Beckenorgane, etc.:* Friedrich Cohen, Bonn, 1892.

[4] Pestalozza, Ernesto.—*Anatomia dell'Utero Umano:* Vallardi, Milano.

[5] Pinard, A., and Varnier, H.—*Études d'Anatomie obstétricale:* G. Steinheil, Paris, 1892.

[6] Barbour, A. H. F., and Webster, J. C.—*Royal College of Physicians Laboratory Reports*, vol. ii.: Young J. Pentland, Edinburgh, 1891.

[7] Braune, W., and Zweifel, P.—*Gefrierdurchschnitte, etc.:* Veit & Co., Leipzig, 1890.

[8] Testut, L., and Blanc, Em.—*Anatomie de l'Utérus pendant la Grossesse et l'Accouchement:* Octave Doin, Paris, 1892.

[9] Tibone, D.—*Tavole Omolographiche sulla Placenta Previa:* Rosenberg & Sellier, Torino, 1894.

[10] Zweifel, P.—*Zwei neue Gefrierschnitte Gebärender:* Veit & Co., Leipzig, 1893.

[11] Von Mars, Anton.—*Medianschnitt durch die Leiche einer an Uterusruptur verstorbenen kreissenden:* Universitätsbuchdruckerei, Krakau, 1890.

labour. In 16 cases which died during labour the cause of death is given. Five died from eclampsia, three from heart-failure, two from phthisis, and one from pulmonary œdema. One of the cases of heart-failure showed almost complete obliteration of the coronary arteries by endo-arteritis, but no fatty degeneration of the muscle. One died in a condition of asphyxia from congestion of an enlarged thyroid, the sudden congestion being produced by labour; and four died from causes in the uterus, two being placenta prævia and two rupture.

As the Fellows of the Society are familiar through other channels with Webster's sections and my own, I shall only touch upon these briefly, and devote attention in this paper to the other frozen sections given in the Table,—looking at them especially in their bearing on the Mechanism of Labour, and on the Third Stage.

This paper deals, as I have said, specially with the Mechanism; but before considering that, we shall note some points in these sections[1] with regard to the uterus and its surroundings,—which supplement the fuller description given of them in my former paper.[2]

We give, first, the *dip of the peritoneum* in the sections before labour and in the first stage, measured from the plane of the brim,[3]—*before* and *behind* the uterus respectively:—

Webster's fifth month pregnancy,		$2\frac{3}{16}$	and	$3\frac{1}{4}$	in.	below.
Pestalozza's sixth month	„	$1\frac{1}{2}$	„	4	„	„
Soffiantini's sixth month	„	$\frac{1}{4}$ in. above	„	$3\frac{3}{4}$	„	„
Pinard and Varnier's eighth month	„	at the brim	„	$3\frac{1}{2}$	„	„
Braune and Zweifel's ninth month	„	„	„	$4\frac{1}{4}$	„	„
Testut and Blanc's sixth month pregnancy, with membranes ruptured,		„	„	5	„	„
Pestalozza's first stage,		$\frac{5}{8}$ „	„	3	„	„
Pinard and Varnier's first stage,		$\frac{3}{8}$ in. above	„	$3\frac{1}{2}$	„	„

For the second stage, we find the following results:—

Barbour and Webster, .	·1 in. above and $2\frac{1}{2}$ in. below.
Zweifel (placenta prævia case),	·37 in. above and at the brim.

[1] We include here the sections from pregnancy as well as those from labour, as they are necessary to a full understanding of the changes produced by labour.

[2] *Edin. Med. Journ.*, vol. xxxii. pp. 891, 1082.

[3] It is difficult to say which is the best mode of expressing the dip of the peritoneum posteriorly. It might be measured from the anus or in relation to the level of the sacral vertebræ, which allows better of its comparison with the dip in the non-pregnant condition. The changes in the form of the sacrum, however, make this last a varying factor; and as the point we wish to bring out is its displacement in labour, the plane of the brim is the best place to measure from.

This shows that at this stage the peritoneum is lifted up both before and behind. The cases of rupture are omitted for obvious reasons.

In the third stage, we find the following to be the condition :—

Pestalozza,	. .	1½ in. below (section oblique).
„	. .	1 in. below, 4¼ in. below.

After delivery, we find the following :—

Barbour and Webster's first day of puerperium, ...	2 in. and 4½ in. below.
Webster's second day of puerperium, .	2¼ „ „ 4 „ „
„ third „ „ .	2⅜ „ „ 4⅛ „ „
„ fourth „ „ .	2⅞ „ „ 4 „ „
„ sixth „ „ .	2⅞ „ „ 3½ „ „

These figures must be taken with reservation, as the dip of the peritoneum in vertical mesial section is not necessarily its deepest point. They show, however, an elevation, during the second stage, of the utero-vesical pouch, and also of the pouch of Douglas; and a subsequent return of those structures to their usual position.

It is noteworthy that in two cases in pregnancy the peritoneum does not, apparently, descend into the pelvic cavity anteriorly; while in two others in which the first stage was only commencing it was also at the brim or above it. This shows that the dip of the peritoneum in the middle line anteriorly is variable,—a fact which must be borne in mind in estimating the amount of its elevation during the second stage of labour.

The relations of the Peritoneum at the sides of the Uterus at full time are not always given; but Pestalozza notes that in his case the base of the broad ligament was elevated, as it also was in one of the cases described by Webster and myself, although in the other one the relations were the same as in the nulliparous condition.

The *Bladder* is also in part an abdominal organ,—in two of the sections from pregnancy extending to ¾ in. and 1¾ in. above the brim; while in one of the first-stage sections it is 1½ in. above the pubes.

As to the *Cervix*, we have four sections showing the undilated cervical canal throughout—from the fifth, sixth, and ninth months: in three of these it is 1 in. in length, and in one (one of the two sixth month ones) it is 1¼ in.

The *height of the fundus* at full time is in three cases opposite the first lumbar, and in one opposite the second,—the distance above the pubes varying from 9 in. to 11 in.

The Lower Uterine Segment and Retraction Ring.

The nature of the Lower Uterine Segment is discussed by Testut and Blanc, *à propos* of their frozen section of a patient who died of

eclampsia in the sixth month of pregnancy, after rupture of the membranes.

We note in passing that the sacrum in this case was asymmetrical—the right half measuring 1¾ in. broad, while the left measured 2 in. There was also deficiency of the anterior layer of the right broad ligament, and only a rudimentary round ligament and tube on the same side. This case resembles one of Webster's sections, in which one ovary was absent. It is also interesting to note the defective development of the uterine appendages on the same side as that of the sacrum.

The pelvic portion of the uterus in their section had its walls 3 to 4 mm. thick, as against the abdominal portion, where the walls are 7 to 11 mm. thick, except at placental site. Comparing their section with others from pregnancy and labour, they come to the conclusion that when a woman is in labour, it matters not at what month of gestation, there is present without doubt a lower segment which is distended by the presenting part. The variability in the presence of the contraction ring is accounted for by (1) the contractile energy of the uterus and the time during which it has been exerted; and (2) the relation of the wall to its contents—for there must be a depression (usually round the neck of the fœtus) into which the wall can bulge. Unless death happens during a pain no ring will be present except a *re*-traction one. They describe in detail the characters of the lower segment as ascertained clinically by passing the finger through the os internum. They believe there is no ground for describing a lower segment as present in the non-pregnant uterus; that it is present in pregnancy only after the eighth month (perhaps the seventh in a primipara), but in all cases of labour early or late.

The various anatomical data by which the lower segment has been defined are criticised. The *membranes* are not less firmly attached over it, unless contractions have been present or the segment unusually dilated; the *firm attachment of the peritoneum* is an irregular line absent entirely at the sides of the uterus, nor is its firmness specially related to the insertion of the muscular fibres into it. As to *bloodvessels*, the coronary vein is not constant; and, while fewer arteries are given off to the lower segment and their course is less tortuous, there is no big branch at the contraction ring. In the *muscular wall* they find the arrangement of the fibres in long parallel plates as described by others.

I have given Testut and Blanc's statements as to the retraction ring somewhat fully, as I think they are right in emphasizing its clinical importance as against its anatomical. Although it was well marked in the section from the second stage made by Webster and myself, it is by no means always present in frozen sections; and some may be sceptical of its identity when they find Braune saying, in the text of the section described by himself and Zweifel, "A contraction ring may be seen and traced round the cavity;" and Zweifel, in another part of the same text, stating that "the

absence of the contraction ring points to the patient's not having been in labour."

Such discrepancy of statement is, I think, an additional reason for using the term "retraction ring" instead of "contraction ring." Contraction is a transitory phenomenon, and the chances of its being fixed by frozen sections are small; but retraction, being a permanent thickening, will be registered in a frozen section. While there may be doubt as to the presence of a contraction ring, there never can be any question as to the presence of a retraction one; and it will or will not be present according to the extent to which retraction has occurred in connexion with the emptying of the uterus. Further, it is to its being a retraction ring that its importance clinically is due,—that is to say, that one part of the uterus stands out thicker in contrast to a portion which has become thinner, and is therefore in danger of rupture.

Thickness of Soft Parts.

Frozen sections draw attention to the importance of the soft parts in labour. In studying labour we are apt to think of the bony canals as the important factor, because as students we get up the mechanism of labour from a bony pelvis. The study of the soft parts, however, shows how materially the form of the bony pelvis is modified by them, and the part they play in determining the mechanism of labour. To this latter point we shall return when we discuss internal rotation.

As to the *thickness of the soft parts* lining the bony pelvis, Zweifel's placenta prævia section gives us valuable data for measuring them.

They are—at the brim, $\frac{3}{4}$ in.; in the cavity, $1\frac{1}{4}$ in.; and at the outlet anteriorly, $\frac{3}{4}$ in.: as against $\frac{1}{2}$ in., $\frac{3}{4}$ in., and $\frac{7}{8}$ in. respectively, in our own section.

In considering the mechanism of labour we shall group the facts brought out by these sections and the questions raised by them round the various factors in labour.

The Contracting Uterus.

We are still in want of information as to the anatomy of the uterus during a pain. In my former paper, already referred to, I drew attention to the fact that the long axis of the uterus is in some sections parallel to that of the spine, while in others it is more in the axis of the brim; and suggested that the former represented the condition in the intervals between the pains, and the latter that during a pain. In all this series of sections, with one exception, this parallelism of the abdominal portion of the uterus is present—the exception being Braune and Zweifel's. I say "the abdominal portion," because it is the active one and can change its position; the part below the brim must, of course, adapt itself to the curvature of the bony canal. It might seem at first as

if there was no question that the axis of the uterus must be thrown forwards during a contraction, because, clinically, we can feel it rising towards the abdominal wall. But this is far from being an accepted fact. Under the whole of Pinard and Varnier's discussion of the mechanism of labour in the text accompanying their beautiful *Atlas*, there lies the tacit assumption that the direction of the force of the uterus is in a line parallel to the spine rather than to the axis of the brim. "As we wish," they say, "to confine ourselves to-day to anatomical data ['terrain anatomique'], we do not speak of the modification, which we believe to be insignificant with a 'sufficient' abdominal wall, in the posterior inclination of the uterus caused by uterine contractions." The representation, however, of the mechanism of labour without uterine contractions is the play of Hamlet with Hamlet left out; and the changes produced by them equally form part of the "*terrain anatomique.*" The anatomy of labour has as much to do with the uterus during a pain as in the intervals; although the chances of our obtaining material so as to study this are small. As to a "sufficient abdominal wall," the abdominal wall of a primipara should be "sufficient" (*i.e.* sufficient to resist the rising forward of the uterus from the spine); and both Braune's original section and that he published more recently with Zweifel, which show the uterine axis thrown forward into the axis of the brim, were from primiparæ.

The question whether the axis of the uterus changes during a pain has many bearings. It has a bearing on the engagement of the head, which we shall refer to later on. Pinard and Varnier, we shall see, describe the process of engaging with the head lying as it does when the uterus is parallel to the spine. On it also hinges Schmidt's theory of the cause of the forward movement of the head in rotation, when he associates the forward slipping of the lower pole (head) of the fœtus with a backward pressure of the upper pole against the spinal column.

We must wait for further sections to clear up this point. In the meantime, we may say that the fact that in some frozen sections the long axis of the uterus is thrown forwards into the axis of the brim, shows that the axis of the uterus is not always parallel to the spine. This change in its direction is not due to posture, as the cadavera were frozen on the back; the only explanation is that it was due to uterine contraction, and this accords with the facts of clinical observation.

The Parturient Canal.

Taking up, now, the second factor in labour—the Soft Canals—Zweifel has given us in his Frozen Sections from Rupture of the Uterus and Placenta Prævia the first demonstration we have had of the genital canal patulous throughout. They are both unique cases. In the one the mother died just before the head was coming

through the vulva—its slipping through taking place by the moving of the body after death. The vulva is therefore dilated by the neck of the child. In the other the mother died after the child was turned to stop the hæmorrhage from a placenta prævia. The child was not extracted: the vulva is dilated by the leg. As to the period at which the tear occurred in the case of rupture (which has a bearing on the degree of stretching of the canals), Zweifel believes that it occurred post-mortem, as the head could not have been expelled post-mortem had the uterus ruptured previously. He therefore sets it down to post-mortem spasm. There does not seem sufficient evidence of this, for the argument turns on the possibility of the head's being driven through the vulva after rupture. The patient was a multipara, and much force would not be required to do this. It seems more likely that the rupture took place just as the head was at the vulva,—*i.e.*, just when the patient died, being, perhaps, itself the immediate cause of death; and that the uterus remained sufficiently attached to expel the head.

These two sections of Zweifel's not only give a complete demonstration of the genital tract throughout, but raise the question again as to the parts into which the tract is to be divided. He would make the retraction ring coincide with the os internum, and thus abolish a lower uterine segment. I need not take up your time by recalling the discussion which took place around this disputed area, and which Zweifel re-opens in the text of his Atlas; it will be sufficient to draw your attention to the close resemblance between the appearance of this portion of the genital tract in these two sections and Braune's first section, which initiated the discussion. Zweifel's grounds for pronouncing this ridge to be the os internum are insufficient. He says that in the placenta prævia case cervical epithelium was found below it and decidua above; he adds, however, that the membranes were attached up to it on the right side. In the rupture case he gives no microscopic examination, but defines the os internum by the firm attachment of the membranes. Now, the membranes are always detached for a considerable distance above the os internum; they must be so to allow for the formation of the bag of membranes. Their extent of separation from the os internum upwards was, in Chiari's case and in that described by Webster and myself, up to the retraction ring. If by defining the os internum by the attachment of the membranes in the first case (in which the head was on the perineum at death) Zweifel means that the membranes were attached up to the ridge which he *calls* the "os internum," no stronger evidence could be adduced that it is not the os internum but the retraction ring. And with regard to the second case, against the fact that cervical epithelium was found below the ridge we must set the fact that the membranes were attached up to it on the right side. For, though the cervix was not much dilated by natural means in this

case, it is difficult to see how the fingers could be passed into the uterus and the child turned and the leg pulled down without separation of the membrane over the lower segment, *i.e.*, above the os internum.

Von Mars' interesting Section from a case of rupture of the uterus falls to be considered here, as it is of interest with regard to the lower segment, cervix, and vagina.

The *clinical history* of the case is remarkable. The patient, aged 44, had had seven normal labours previously. On washing-day, after lifting a pot at 2 P.M., she was taken ill and felt the waters break. The midwife found the cervix taken up, the os externum the size of a crown piece, the head high in the pelvis without a *caput succedaneum*, and a slight hæmorrhage. There were no further pains till 4 P.M., when they returned at very long intervals. At 8 P.M. the os was fully dilated and the head began to descend; it advanced rapidly, but without the patient's complaining of pains. On reaching the pelvic floor it remained there, and there were no further pains. At 9 P.M. there was a rigor and some abdominal pain, after which she was comfortable. At 10 P.M. a second rigor with pain, after which she fainted and in half an hour died. After that fœtal movements were noticed by the midwife through the abdominal wall, but the doctor arrived too late for Cæsarean section. The examination post-mortem of the head and chest showed only anæmia of the organs there.

I have given the history of this remarkable case, because it shows the absence of all the conditions which we associate with rupture. There was no obstacle to delivery, no interference, and the labour was not long. To explain the rupture, Von Mars assumes a spastic contraction (tetanus) of the uterus, shown by the head's descending rapidly and without the patient's complaining of pains; and a stricture of the vagina, shown by the head's being arrested there, and the unusually narrow base of the *caput succedaneum*. But such a spastic condition of the uterus—persisting, as he assumes, through the whole second stage—would surely not be painless; and the vagina, on seven previous occasions, allowed the head to pass without difficulty. The only explanation which seems to me to account for rupture in this case, and also in Zweifel's, is that the uterus by one sudden and violent contraction ruptured itself. The noteworthy point in both these cases is that there was no obstacle to the passage of the child. It cannot, therefore, have been on account of an abnormal resistance that rupture occurred, but by an abnormal contraction. One might compare it to rupture of the muscle of the leg in kicking a football. The ball was no heavier than on other occasions, and was probably kicked no further, but by an excessive strain the muscle ruptured itself.

It is curious that the two sections we have from cases of rupture of the uterus should both be anomalous.

Von Mars' frozen sections show the head at the vulva, L.O.A., and partially rotated. It has not receded, though the lower extremities and more than half the trunk are in the peritoneal cavity.

There is a longitudinal rent to the right of the middle line anteriorly, stopping short at the peritoneum; and an antero-posterior one on the left side, continuous with the former, beginning about the level of the upper margin of the symphysis, and extending upwards and backwards to a point opposite the junction of the fourth and fifth lumbar vertebræ. It is distant from the *os externum* ¾ in. anteriorly and 3¾ in. posteriorly. The uterus torn from its attachment on the left side along this line is tilted over into the right lumbar region. The gap thus formed is in relation below to cellular tissue, as the reflection of the peritoneum is more than an inch higher up; then comes a flap of visceral peritoneum which ends in a torn margin running from the umbilicus horizontally backwards. Anteriorly, the retraction-ring is at the level of the umbilicus, 6½ in. from the os externum; posteriorly, between the 4th and 5th lumbar vertebræ, 3¾ in. from the os externum.

The lower segment and cervix are, therefore, nearly twice as long in front as behind, the increase in length being partly due to the anterior rupture.

The os externum is not higher here than in our own case or than in Zweifel's case of rupture (extending from between one-third down the symphysis to between the second and third sacral vertebræ). The vaginal walls measure—anteriorly, 2¾ in. long; posteriorly, 5½ in. Von Mars, quoting Luschka, who gives the length of the non-pregnant vagina as from 4½ to 5½ in., affirms that the vagina is not elongated in this case, and that this supports his view that the vagina contracts actively during labour; for the fact that it is not longer here shows that it must have contracted after dilation by the head. Frozen sections show, however, that Luschka over-estimates the length of the vagina. It is undoubtedly longer here than in the non-pregnant condition, though not so long posteriorly as in our own specimen, because the head has not descended so far.

In our own section, made when the head was in the perineum, the anterior vaginal wall measures 2 in. and the posterior 7 in. In frozen sections not in labour, we find an anterior wall of 2 in., and a posterior of 3 in. It would appear, therefore, that the anterior wall is not altered, while the posterior is greatly elongated.

The Fœtus.

Passing now to the third factor in the mechanism of labour—the Fœtus—we note that, with one exception, the chin of the child is in every case on the sternum before labour begins,[1] and during the

[1] To emphasize the point, we quote from the various texts the descriptions of the position of the head:—

"La testa fortemente flessa sulla parte alta ed anteriore del torace." (Soffiantini, p. 8.)

"Assai piu marcata è la flessione della testa sul piano anteriore del tronco: la flessione è spinta al Massimo essendovi forzato addossamento del mento al piano sternale." (Pestalozza, p. 6.)

"La *tête*, fléchie au point que le menton est étroitement appliqué sur la région sternale, est *asynclitique* et *présente son pariétal postérieur*." (Pinard and Varnier, p. 85.)

second stage until the head is born. The one exception is Pinard and Varnier's occipito-posterior case, in which the chin is extended to the extent of 1¼ in. It is interesting to note this exception as occurring in an occipito-posterior, where from clinical observation we are more likely to meet with extension. But the chief value of the separation of the chin from the sternum in this single instance is that it shows that the approximation of chin to sternum in other cases is not a post-mortem change due to the sinking down of the body of the fœtus before freezing; otherwise, it would have been present here also. In my former paper[1] I dwelt on the importance of this fact, brought out by frozen sections, as necessitating a revision of our description of the mechanism of labour, in which flexion has hitherto had an important place; and no fact has struck me more in studying this array of sections than the persistence with which the fœtal chin is on the sternum. Frozen sections teach us that flexion plays a very subordinate *rôle* as a movement in the mechanism of labour as compared with, say, internal rotation,—in fact, that it is a question whether we are justified in speaking of it as a movement in labour at all. "Flexion" is not a motion, but an attitude. This does not imply that a movement of flexion may not occasionally take place; there may be a disturbance of the normal attitude of the head as of any other part of the body, and this disturbance may be corrected by a movement of flexion. But to say this is quite a different thing from describing flexion as an integral part of the mechanism of labour, and putting it alongside of internal rotation. It is interesting to note that the fœtus grows flexed,—that is to say, in that position in which it can most easily escape from the uterus. It is apart from the purpose of this paper to discuss how this has been brought about, whether by the killing-off of all fœtuses which did not conform to this position; but it is obvious that this is the easiest attitude in which the fœtus can be expelled; whether it is a case of the survival of the fittest or not, it is at least a survival of the fitting. Zweifel says, "That marked flexion with firm pressure of the chin on the sternum must be the result of labour. It is not necessary to assume a different position of the head in the fœtus from that in the child." It is not necessary to make any assumption when we have the facts of frozen sections before us, and a child after birth is not in the habit of curling itself up like a hedgehog as the fœtus has done in Zweifel's Plate XI., Fig. 1.

"La tête . . . très fléchie, puisque la région sus-hyoïdienne est étroitement appliqué contre la paroi antérieure du thorax." (Pinard and Varnier, p. 91.)

"Der Kopf in Beugestellung zur Brust sich befindet." (Braune and Zweifel, pp. 17–18.)

"La tête est fortement fléchie sur le thorax." (Testut and Blanc, p. 7.)

"La testa così inclinata allo stretto superiore è gia flessa, con non rara anticipazione del primo movimento meccanico del parto." (Pestalozza, p. 5.)

[1] *Loc. cit.*

Engagement of the Head.

Closely associated with the hitherto described "movement" of flexion is the engagement of the head. In French midwifery, where the mechanism of labour is analysed into six stages ("*temps*") instead of the four movements of English midwifery with which we are familiar, the engagement of the head, or "descent," is described as following flexion and preceding internal rotation. In none of the frozen sections is the head at the brim synclitic,—that is to say, its occipito-frontal or sub-occipito-bregmatic diameter is never parallel to the plane of the brim, but always cuts it at an angle. I noted this in my former paper as a peculiar feature in Schroeder's section and in my own in the first stage; and considering it as abnormal, attributed it to the death of the child *in utero* having made its head unusually limp. But all the frozen sections made since, both before labour and during the first stage, show a certain amount of asynclitism, and not the asynclitism of Naegele, in which the anterior parietal bone is more prominent, but the opposite condition. By this I mean that if you draw a line representing the plane of the brim, you will find more of the posterior half of the head below that level than of the anterior.

Pinard and Varnier have noted this fact specially in their sections, and cite also Winter's and Braune and Zweifel's sections and my own in the first stage as illustrating this. They go further, and begin the part of the text of their Atlas treating of the engagement and descent of the head in normal pelves with the thesis that the mechanism of labour in the normal pelvis is almost identical with that in the rickety. As in the rickety, the head is transverse, scarcely flexed, so that the finger touches with equal ease each of the two fontanelles; and, as the uterine axis is less oblique than that of the brim, the axis of the head does not correspond with the latter, but the sagittal suture is nearer the symphysis. The anterior parietal bone overhangs and projects beyond the symphysis, so that it is inaccessible through its greater extent; while the posterior parietal, which almost alone occupies the superior strait, can be reached and touched throughout up to the ear.

Smellie's description of the head at the brim and his Plate XII. (in which the head is transverse, with the vertex almost resting on the pubes, and the posterior parietal bone presenting) are quoted as representing truly the position at the commencement of labour.

Then follows a sketch of the history of obstetrical teaching since then, which might be described as consisting of—first, the assertion by Naegele and his followers, that the anterior parietal bone presented; and then the recoil from that, in the generally received view that the vertex presents. Pinard and Varnier maintain that their frozen sections demonstrate that the axis of the uterus does not coincide with that of the pelvis; that the head is not synclitic,

but inclined on the posterior parietal bone; that engagement is a correction of this inclination, the retarded parietal bone descending and the sagittal suture reaching the axis only when engagement is complete. That they are right as to a greater extent of the posterior parietal, as compared with the anterior, lying within the brim will be seen from the following Table, in which I have estimated it upon their own sections and others available for this measurement:—

Observers.	Period.	Amount of Head below the Brim, measured vertically from the latter.	Proportion of Posterior Half of Head through the Brim.
Pinard and Varnier.	7½ mo. of preg.	2¼ in.	4⅜ in. out of 6½ in. circum.
„ „	8 „ „	2¼ in.	5⅜ in. „ 6½ in. „
Braune and Zweifel.	9 „ „	2⅜ in.	3¾ in. „ 7⅛ in. „
Winter.	I. stage.	2⅜ in.	3½ in. „ 7 in. „
Sæxinger.	I. stage.	2 in.	2 11/16 in. „ 6 in. „
Barbour.	I. stage.	3 in.	3⅜ in. „ 7¾ in. „
Barbour and Webster.	I. stage.	2¾ in.	3¾ in. „ 7¼ in. „
Pestalozza.	I. stage.	2¼ in.	4⅛ in. „ 6½ in. „

This Table brings out the fact that the head is not synclitic in frozen sections; but the figures must be taken only as indicating this generally, and not as giving the amount of it. For there is a fallacy in estimating the relative amounts of the two halves of the head within the pelvis from the position of the sagittal suture in a mesial section. If you place a skull L.O.A. in the pelvis, holding it synclitic and in the centre of the pelvis, the cross section of the suture made by a vertical-mesial section of the cadaver will appear in the axis of the pelvis; but if the skull be moved towards the right side of the pelvis, the cross-section of the suture will move nearer and nearer the symphysis, and the appearance of a posterior parietal presentation will be simulated.[1] In order to calculate from the sagittal suture in section we must know exactly the position of the head in the pelvis. On the other hand, the base of the skull when it is cut across gives a pretty true indication of the amount of asynclitism.

Further, the inclination of the brim must be taken into account. The more vertical the brim is the more will the head rest on the symphysis, instead of sinking through the brim.

The difference in inclination of the brim is a noteworthy feature in frozen sections, and this is one of many points which sectional anatomy brings to light as worthy of study. We are not justified in reasoning from a frozen section with the body on the back to

[1] The amount of parietal bone presentation is exaggerated by this means in Pl. xxxii. of Pinard and Varnier's Atlas, although there is no doubt that it is present.

the living subject in the erect position, but we can quite well compare one section with another, especially those frozen in a similar posture.

On comparing one section with another, we note that the inclination of the brim varies greatly, and one effect of this is to bring a greater or less proportion of the posterior half of the head within the plane of the brim.

Clinical experience tells us that posterior parietal bone presentation is rare; and therefore the evidence of frozen sections must be thoroughly scrutinized on this point. We must wait for more material before this question can be settled; for the mobility of the head at the brim is such that the element of accident must enter largely, and therefore we must have a large number of cases to reason from. It is sufficient, in the meantime, to state the following propositions:—

1. Frozen sections furnish us with the means of studying labour at a still earlier period than clinical investigation. Clinically, we cannot say with precision how the head is lying until the cervix is well dilated, and even then only when there is little fore-water. The facts that we are considering belong to a period before the mechanism of labour, as described in English midwifery, has begun.

2. The facts concern multiparæ more than primiparæ, as in the latter the head is already in the pelvis before labour begins.

3. We have been studying the position of the head in the intervals between uterine contractions. This asynclitism is probably modified during a pain.

4. Frozen sections show us generally the relations in the horizontal posture; these will be modified when the patient is erect, as she usually is during the first stage.

One word with regard to the mode in which Pinard and Varnier state their thesis. Even if it should be proved that this change in the presentation of the head takes place as a preliminary to the mechanism of labour, it is a false analogy to compare this to what occurs in a flat pelvis. For in the latter the transverse position of the head and the presentation of one parietal bone are necessary parts of the mechanism, without which the head could not be born; they belong essentially to the second stage, and have associated with them strong uterine contractions. There may be a resemblance between the rickety and the normal mechanisms, but it is only a superficial one; it is, so to speak, only an accident of normal labour that we find the head transverse and asynclitic in the multipara, for neither of these conditions is found in the primipara, in whom we have the best opportunity of studying normal labour; while they are of the essence of labour in a flat pelvis, being found there just as certainly in the primipara as in the multipara.

The Cause of Internal Rotation.

Zweifel, in the text of the section published by him with Braune, has drawn attention specially to the thickness of the soft parts in the lower part of the pelvis as modifying its shape and producing the internal rotation of the head. He draws attention to Hodge's second parallel plane (*i.e.* of the plane passing through the lower edge of the symphysis and parallel to the plane of the brim) as being of more significance for the mechanism of labour than the plane of the cavity. He gives a drawing showing the amount of soft parts in this plane and in the plane of the outlet taken to lower end of sacrum, as also in that of the brim.[1] This drawing shows that the form of the pelvis, *plus* soft parts, becomes an ovoid with the long diameter antero-posteriorly in the second parallel plane, and still more so in the plane of the outlet. The greatest circumference of the fœtal head will have come to lie in the first of these planes at the time when he has noted clinically that rotation occurs. The frozen section shows that the greatest circumference is 2 ins. above the leading point of the vertex, which has not yet reached the point at which he has noted clinically that rotation begins: hence rotation has not occurred in this section. But were the head to descend two fingerbreadths further, rotation would be complete.

The shape of the pelvis, however, in any one plane does not give a complete account of rotation, or at least there are other factors which must be taken into account. In limiting his attention to the plane of the greatest circumference of the head and to the form of a given plane of the pelvis, Zweifel omits all reference to the action of the pelvic floor on the vertex. We cannot give a complete account of the process in terms of horizontal planes. The obstetric canal is a basin with a floor; and the form of the canal, vertically as well as transversely, must be taken into account. Zweifel's *rationale* of internal rotation has this great value, that it emphasizes the form of the canal in cross section; but it is incomplete, inasmuch as it makes no reference to the vertical relations—in one word, to the action of the pelvic floor in directing the vertex forwards, which Hart has specially drawn attention to.

The Third Stage.

Pestalozza has given us two extremely interesting sections showing the condition of the uterus at the commencement of the third stage. They have this further interest, that one was a case of twins. We must note that the children were removed by forceps and turning, not expelled by uterine contractions; and

[1] As to amount of soft parts at the brim, this Plate does not agree with the text: while the former shows as much soft parts in the oblique as in the conjugate diameter, the text gives ·7 cm. as against 1·4 cm.

therefore they show us a uterus which has been relieved of its contents, and which has shrunk chiefly through retraction, rather than one which has expelled the child by vigorous contractions. The cause of death in one of the cases is of special interest, as showing the circulatory disturbances produced by labour. The patient had an old goitre which became suddenly congested during labour, and caused death by asphyxia.

These are the first and only sections we have showing the uterus *in situ* at the commencement of the third stage. The body was frozen in the one instance in the erect, and in the other in the dorsal posture, and this must be borne in mind in studying the sections.

The first of these cases died immediately after the extraction by forceps of a still-born child. The anteversion of the uterus is exaggerated by the body's being frozen in the erect posture and the opening of the thorax. The mass of the uterus, as shown in section, is 8 ins. by 4 ins. Of the 4 ins. antero-posteriorly, 1 in. is anterior wall, $\frac{1}{4}$ in. is posterior, and the remaining $2\frac{3}{4}$ ins. is the placental mass, there being no space between the placenta and the anterior uterine wall. The placenta "shows no signs of separation through its attachment of $8\frac{1}{8}$ ins." It is interesting to note the absence of retraction at the placental site shown by its length (the diameter being not much less than what we find before labour) and the thinness of the wall ($\frac{1}{8}$ in. to $\frac{1}{4}$ in.), which contrasts strikingly with the retracted anterior wall 1 in. in thickness. The membranes are separated over the lower segment, hanging in folds into the vagina, but are still adherent to the rest of the uterus, though not everywhere with equal firmness. The amnion is detached over a considerable area from the chorion.

The condition found in this preparation corresponds in every point to that which I described in a former paper.[1] I quite endorse Pestalozza's statement that the reduction in size of the uterus is here due to retraction which has not specially affected the placental site; and that a moderate retraction, such as usually accompanies the emptying of the uterus, is not sufficient to initiate separation of the placenta if contractions do not intervene.

The second section is from the case of twins, delivered by forceps and turning, in which death was due to congestion of the thyroid. The body was frozen in the dorsal posture; and we find the uterus resting on the spine, not anteverted, as in the former case. Its highest point stands 7 ins. above the symphysis. The peritoneum descends within the pelvis in front and behind for 1 in. and $4\frac{1}{4}$ ins. respectively. The bladder lies behind the pubes. The uterus, containing two placentæ, measures 8 ins. vertically and $4\frac{1}{2}$–5 ins. antero-posteriorly. The placentæ are attached, one over the fundus

[1] Uterus during Third Stage and Post-partum, *Edin. Med. Journ.*, 1884.

and left half of the uterus, the other over the right half, the anterior and posterior walls, and extending on to the lower segment. From the point where the placentæ touch each other on the posterior wall there rises the septum of membranes dividing the two sacs, the folds of which fill up the space between the placentæ. It passes horizontally forwards, so that the two sacs lie one above the other.

The chief points of interest here are the great diminution in area of the internal surface of the uterus, with the non-separation of the placenta even over the lower segment. The thickening and folding of the placental tissue are also of interest as showing how the placenta accommodates itself to the reduction of its site. The position of the sacs, one above the other, is also of interest.

Pinard and Varnier give sections of the uterus removed from the body from five cases illustrative of the third stage. Two were delivered by Cæsarean section, two by forceps, one spontaneously. Of these, the following two are of special interest.

One was from a patient with triplets, who died during the first stage. She became suddenly cyanosed and collapsed. Three living children were extracted by turning. The post-mortem showed the arteries of the heart almost obliterated by endo-arteritis with increase of connective tissue, but no fatty degeneration of the muscle, in the heart-wall.

The uterus is $13\frac{1}{8}$ ins. long and $3\frac{1}{4}$ ins. thick, $\frac{3}{8}$ being anterior wall, $2\frac{1}{2}$ ins. placentæ, and $\frac{3}{8}$ posterior wall. The larger placental mass, which covers the posterior wall for $9\frac{1}{4}$ ins., has two cords passing from it. It is not separated from the uterine wall except for rather less than an inch at its lower border. It is thickened and folded, and bulges at the borders. The placental mass which covers the anterior wall for $5\frac{1}{4}$ ins. is that of the third fœtus. It is not separated at all, but has its borders projecting.

Three of the other cases show similar conditions,—namely, the placentæ not separated but thickened, bulging at the borders, and in some cases folded.

The fifth case is from a later period in the third stage, the placenta undergoing expulsion. It is from a case of eclampsia in which the child was born spontaneously. Patient had eclamptic convulsions and coma, and there was bleeding from the vagina before death. The post-mortem showed a longitudinal tear of the lower segment, with considerable sub-peritoneal extravasations into the right broad ligament, and extending upwards into the iliac fossa. Before freezing, it was noticed that the cord was presenting. The uterus measures $8\frac{1}{4}$ ins. in length and $3\frac{1}{2}$ ins. in thickness. The placenta, which was attached to the anterior wall, lies inverted in the lower segment, distending it. It presents by the cord at the os externum, which is dilated to one-fifth of an inch. There is a cup-shaped space behind the placenta filled with blood.

Commenting upon these sections and other anatomical preparations, the authors state that they have found the placenta most frequently on the posterior wall, and note that the wall at the placental site is thinner than elsewhere. During labour the placenta is not separated before the fœtus is expelled. The uterine walls do not thicken equally; but that at the placental site remains thinner, giving the appearance of the placenta's being embedded in the wall (*enchatonné*). Further, the placenta becomes thicker, bulges, but does not yet separate. When separation begins, it is at the margin; and it is due to the elasticity, retractility, and contractility of the muscle. The membranes are not, as a rule, separated till after the placenta. The descent of the placenta into the lower segment makes the fundus rise from 1 to 1½ inch. Although Baudelocque's description of the mode of separation of the placenta was erroneous, one of their preparations shows that his description of its mode of delivery was correct.

These sections by Pestalozza and Pinard and Varnier are of great value, from the light they throw on the Third Stage of Labour. Though they do not bring out new points, they give confirmation from the data of sectional anatomy of certain facts with regard to the third stage which I brought before this Society ten years ago. They were these: that the placenta did not separate until the commencement of the third stage of labour; that its texture was such that it could accommodate itself to the shrinking of its site until the uterus contained nothing but placenta, without separation taking place; that there was no empty space in the uterus into which the placenta could bulge; and that there was not sufficient evidence to support the view of Baudelocque and Schultze that retro-placental hæmorrhage was a factor in its separation. It is worthy of note that two of these preparations show placentæ from twins and triplets, which means that before labour there must have been an unusually large uterine cavity, with its area extensively covered by placental tissue. If the placenta were ever to separate by reason of the diminution of its site, it would surely take place under these conditions. And yet in Pestalozza's case, with twin placentæ, there is no separation; nor in Pinard and Varnier's triplets, except at the lower margin of the larger placental mass.

It is noteworthy that in Pestalozza's case one of the placentæ has extended into the lower uterine segment, and yet even this portion is not separated,—showing that it does not necessarily follow that the placenta will be separated when situated there. While accepting Hart's definition of placenta prævia as a placenta extending on the lower segment as being the best working definition, we see from this section that the delivery of the fœtus can take place without the separation of the part of the placenta situated over the lower segment.

The fact that the placenta does not separate until the third stage of labour has begun is of great significance with regard to loss of blood. The natural means of arrest of bleeding from the placental site is the rearrangement of muscular fibre in retraction, which causes constriction in the vessels. In normal labour there is no separation until retraction has compressed the vessels. The placenta is not amputated until the vessels have been ligatured. Hence the loss of blood in normal labour is trifling.

I endorse entirely all that Pinard and Varnier say about the *separation* of the placenta, except when they speak of separation as beginning "at the border"; I should qualify it by saying, "at the lower border." In describing their specimen from triplets, they draw attention to separation having begun at the lower border without commenting upon it. It is, I think, of importance as showing that detrusion is a factor in separation. Were separation due simply to the retraction of the wall at the site, it would begin at the border *all round*, which is implied in their general description of the process. But its commencement at the lower border shows that it is due to the contraction of the uterus as a whole, forcing the placenta onwards, and telling first of all on the part that is freest to move,—namely, the lower border.

So much for separation of the placenta. As regards its *expulsion*, they affirm that in the greater proportion of cases (789 out of 1000) it presented by its fœtal aspect, and then they point to their frozen section in which the cord presents as showing that Baudelocque's description of the placenta as being born inverted is correct. But the "fœtal aspect" is a wide word, and may mean anything from the margin to the centre of the placenta. Where the presenting part lies within 2 inches of the margin, the amount of inversion is so slight that the form of delivery is much more like that described by Matthews Duncan than that described by Baudelocque and Schultze. The section that they give belongs to quite a different category. It shows the insertion of the cord as the presenting part, and clinical experience shows that such a condition is rare.

The Puerperium.

In Webster's extremely interesting sections from the commencement of the puerperium, two new points are brought out. The first is the action of the post-partum uterus as a plug in checking bleeding. He shows how the uterus after delivery fills the pelvis and compresses the veins of the broad ligament, and thus lessens bleeding from the uterus, but not from the cervix. The other point is that the uterus is not diminished much in size during the first three or four days of the puerperium. It is after that period that there occurs the marked change in bulk which we associate with involution.

The Value of Sectional Anatomy.

Let me conclude this review of these recent Frozen Sections by an estimate of the value of this method of inquiry; and to understand this let us look at its scope, its limitations, and results.

1. As to its *Scope*.—To bring this out, let me compare it with clinical investigation.

The vaginal method of examination, which was till recent years the only one, limits the study of labour to all that the fingers can feel per vaginam. Before the os is dilated, the position of the fœtal head can only be determined generally. After dilatation, a little more can be learned, especially if there is not much forewaters, as we can feel the sutures through the membranes. After rupture of the membranes, the area of the head which is within the girdle of contact can be recognised with precision, but it is difficult to define its relations to the pelvis. The divergent views of such careful observers as Smellie, Nægle, and Solayres, show how difficult it is to refer the position of the sutures to the bony canal. The vaginal examination has then these limitations: it deals only with the vertex of the head, and it finds difficulty in fixing the relations of the vertex to the canal. It can tell nothing, absolutely nothing, as to the relation of parts higher up,—for example, of the relation of the child's head to the trunk.

When abdominal palpation came to supplement vaginal examination, the field of observation was extended. The position of the uterus and the height of its fundus could be fixed with tolerable accuracy; the parts of the fœtus located; and the thickness of the uterine wall recognised, especially when it underwent a marked change, as in the production of Bandl's ring. Abdominal palpation has, however, this limitation, that on account of our having to feel through the thickness of the abdominal and uterine walls, there can be no exactness in the description of what is found.

Contrast, now, with these methods, investigation by means of frozen sections. It has opened up what was before a *terra incognita*, and given us an exactness of knowledge with regard to it. Our enquiry is no longer limited to the presenting part, but we study the uterine contents up to the fundus, and note relations with precision. By this method, also, the study of labour begins at a much earlier period; the position of the head before labour, and the changes in its position during the earlier parts of the first stage are now brought within our observation.

Great care is, however, required in carrying over into clinical work the results gained from frozen sections. It is always a more or less cogent criticism that in them we are dealing with the dead, not the living, with anatomy rather than with physiology, with the machinery rather than with its movements. And it is a fair question whether we ought to carry into a working description, adapted to clinical purposes, a class of facts that can

only be studied in frozen sections; whether, to take a concrete case, we should include in the mechanism of labour changes in the position of the head which usually do not come within the scope of clinical investigation.

2. As to its *Limitations.*—While clinical enquiry deals with space in three dimensions, a frozen section is limited to two. In a vaginal examination you are never dealing with a plane, but always with a body; a frozen section only shows one plane at a time. From a series of sections you can construct one form of a given body; but one section gives only one plane. A section of an orange is after all only a section of an orange: it is not the orange which palpation in a second or two can define. To get the complete body you can, as I have said, reconstruct it from a series of sections parallel to each other at a given distance. Failing this, the next best thing would be to cut your orange in three directions, two lengthwise (*i.e.* vertical antero-posterior, and vertical transverse), and once across (*i.e.* horizontal transverse). We must bear in mind these limitations of sectional anatomy in discussing terms introduced by frozen sections. For example, the term "pelvic floor," which is a very suggestive one for describing the appearance seen when the pelvis is cut in one direction, can hardly be carried into a description of the pelvis which takes into account sections made in every direction. So also, in formulating the action of the soft parts in causing internal rotation, we must not take a cross section only, which shows the form of the canal in section, nor a vertical one, which shows the head in relation to the floor; but combine these,—which gives a trough of soft parts, with convergent sides directing the head into it.

3. *Results.*—In stating these, we shall indicate the nature of them rather than make a positive statement with regard to each topic, which, in the present state of our knowledge, could not be final.

The pelvis lined with soft parts has replaced the bony pelvis in our discussion of the mechanism of labour. We no longer think of the bony canal only, but rather of the parturient canal —consisting of lower uterine segment, cervix, and vagina— surrounded, of course, by its bony case. The relations of the peritoneum have been defined, and the position and behaviour of the bladder made visible. The shape and size of the uterus, with the position of the fundus, the direction of its axis, and the thickness of its walls, have become matters of direct observation and precise measurement. The whole idea of a lower uterine segment has grown up round Braune's section and the subsequent ones. We should never have had the discussion as to the lower uterine segment, nor have discovered the normal retraction ring, but for sectional anatomy. The behaviour of the uterine contents in labour has also become matter of direct observation. Before the days of sectional anatomy, the attitude of the fœtus in the uterus

and the relation of the placenta and membrane before labour began were known, but that was all. Now we know the extent of separation of the membranes in the various stages of labour, with the behaviour of the placenta, and the relations of the parts of the fœtus to each other and the bony canal. The old idea of the fœtus as a more or less rigid body has been displaced by one which emphasizes the plasticity of the fœtal mass, the non-rigidity of its spine, and the mobility of the head on the shoulders. The erroneous conception of the parturient canal as a vacant space (without the walls in apposition), which we owe to clinical examination, because the examining hand creates a space wherever it goes, has been replaced by the true one, which shows the walls of cervix and vagina in apposition before labour, and the walls of uterus and vagina coming into apposition directly after it. The retrogressive changes in the puerperium, in so far as these affect the bulk of the uterus, and the height of the fundus, and the length of the canal, have been made the subject of exact measurement.

Frozen sections have then greatly extended the scope of our investigation of the process of labour beyond what was possible by clinical study; and while the method has the limitations which I have indicated, the results stand amongst the most important contributions made during the last half century to the Science of Obstetrics.

Dr Haultain said he was sure the Society must have heard with much pleasure the able and interesting communication Dr Barbour had given them, and also appreciated the vast amount of work it entailed. The points touched upon were extremely important, but, unfortunately, they were so numerous, and were sprung upon them so suddenly, that an extemporary criticism of any weight was impossible. Although by no means a strong believer in deductions arrived at from frozen sections in general, he must congratulate the President on the value of his work on the second stage of labour by this method. There were two points only in the paper under discussion that he would touch upon—viz., the direction of the long axis of the uterus, and the position of the head before labour as regards flexion and Naegele's obliquity. There seemed to be a diversity of opinion on these two points by frozen sectionists which was a very strong argument against frozen sections in general, for if they were to be of any value whatever, they ought, from an anatomical standpoint, to agree in the utmost detail, so as to give any idea of what is normal. From clinical observation and experience he could not accept the view of Pinard and Varnier that the long axis of the uterus was parallel with the vertebral column of the mother; further, it appeared against all laws of Nature that the long axis of the child should not correspond with the axis of the brim of the pelvis through which it had to pass, for if not, an enormous amount of misspent energy would be necessary. The

position of the head at the brim, like every other detail concerned with normal pregnancy and labour, he considered to be merely a matter of accommodation of the compact and definitely shaped passenger to the surroundings and passages. If the head had already entered the brim, as in primiparæ, it would probably be more flexed than when movable above the brim, as in multiparæ. That a certain amount of flexion was the normal developmental attitude of the fœtus *in utero* there was not a shadow of doubt; but that it was not increased after labour commenced and resistance met with seemed improbable. That it was increased with a large head, or a justo-minor pelvis, any one could prove without doubt; therefore, as a teacher, he could not discard the description of flexion as a definite and important movement in the mechanism of labour. As regards Naegele's obliquity, he considered it very much depended on the question of the direction of the long axis of the uterus, as might be seen in Pinard and Varnier's section, where, with it parallel to the maternal vertebral column, it necessarily followed that the post-parietal bone would be lower than the anterior. Unless in the second stage of labour, where the fœtus was fixed in the pelvis, he thought no reliance whatever could be placed on the anatomical relationship of movable structures, like the uterus and its contents. This particularly applied to the anatomical relationships of the third stage and puerperal uterus, from the frozen sections of which little could definitely be learned, though much might be theoretically supposed.

Dr J. W. Ballantyne fully agreed with the President as to the value of frozen sections in elucidating purely anatomical questions, and he had made considerable use of them himself in connexion with the anatomy of the new-born infant and fœtus. But he had not ventured, save in a very few cases, to draw deductions from them as regarded physiological problems. He thought that when the evidence from frozen sections supported and confirmed the results obtained by clinical investigation, one might, however, then accept such evidence as of great confirmatory value. When, however, they yielded results in direct opposition to clinical experience, as with regard to flexion, one ought to be slow to alter our ideas and teaching on such physiological questions without very large experience with much material. With regard to the part of the placenta first expelled from the cervix, he had, by a simple device, convinced himself that normally it was the fœtal surface near the placental border, as, indeed, Champney's more elaborate experiments had shown. It was certainly a striking fact that in two of the sections from the third stage there should have been in one twins and in the other triplets; but it had to be remembered that the case must be extraordinary, else the material would not be available.

Dr James Ritchie said that with regard to the first question put by Dr Barbour, he had often noticed the forward movement of the

uterus during a pain, and although he never made use of a binder during labour, he had often remarked that the forward movement of the uterus during a pain would lead to its compression had a binder been firmly applied previously. With regard to the position of the sagittal suture, he believed that it varied with the shape of the pelvic brim and with the position of the uterus; he had noticed specially its change of position in women with pendulous belly when lying on the left side and when placed on the back. With regard to the expulsion of the placenta, he believed that in the majority of cases its edge was first separated, then driven downwards; he had often felt it being pushed down. When the central portion was expelled first, he usually found that there was greater difficulty, or at least delay, in its expulsion, and, generally, there was a quantity of blood behind it.

Dr Keppie Paterson asked whether Dr Barbour, in his investigation into these frozen sections, had found out any facts throwing light on the supposed action of the round ligaments in steadying the uterus and keeping it forward during a pain?

The President thanked the Fellows for the way they had received his paper, and for their criticism of it. He agreed with Dr Haultain that the mechanism of labour was largely a question of accommodation. While accepting the limitations of this method of inquiry, he was more and more satisfied as to its value; and he could not endorse the statement that the results of sectional anatomy should be accepted when they agreed with those of clinical work, and rejected when they did not do so. The criticism of clinical observation by the results of frozen sections was as valuable as the criticism of the results of frozen sections by clinical observation. Clinical inquiry was as exposed to fallacies as anatomical; and one great service rendered by this anatomical inquiry had been its overturning of some apparently well-established clinical data.

V. A CLINICAL NOTE ON THE HEIGHT OF THE FUNDUS UTERI DURING THE FIRST STAGE OF LABOUR AND AT THE END OF THE SECOND STAGE.

By W. E. Fothergill, M.A., B.Sc., M.B.

Recently several authorities have shown that the fundus uteri does not sink during the first and second stages of labour. This fact is proved (1) by clinical observation during labour, measurement showing the fundus to be as high just before the head escapes from the vulva as at any moment earlier in the labour; (2) measurements of frozen sections of parturient women give the same result. Such frozen sections have been made and described here in Edinburgh by Drs Barbour and Webster, but for clinical evidence on the point we depend on the work of Schroeder and Stratz, Hoffheinz, and others. Dr Stephen and I therefore thought

it would be advisable, while at the Maternity Hospital, to collect some measurements similar to those already made elsewhere.

We accordingly measured, immediately on admission, such cases as were not far advanced in labour,—excluding, indeed, all in whom the head had already entered the pelvis. The callipers were used for taking (1) the height of the fundus above the upper margin of the pubic symphysis, and for measuring (2) the breadth of the uterus at its widest part. A second measurement from (3) fundus to symphysis was taken with the tape measure. These three measurements were repeated with the head at the vulva, as immediately previous to its escape as possible. The head was frequently born just as we completed the measurements, and in several cases we lost our second set of figures by waiting too long. The last thirty cases give the figures noted below. Measurements were all taken during the intervals between pains.

	Max.	Min.	Aver.
1. Height of fundus (callipers), 1st stage,	11¼ in.	7½ in.	9·583 in.
„ „ at end of 2nd stage,	11 „	8 „	9·823 „
2. Breadth of uterus, 1st stage, . .	10¼ „	6 „	7·9 „
„ „ at end of 2nd stage,	9 „	5 „	6·8 „
3. Length of uterus (tape), 1st stage, .	17 „	14½ „	13·6 „
„ „ at end of 2nd stage,	9 „	10½ „	12·6 „

In one case the fundus was 2 inches higher at end of 2nd stage than during 1st stage.

In one case the uterus was 3 inches narrower laterally at end of 2nd stage than during 1st stage.

In one case the measurement by tape from pubes to fundus was 3 inches less at end of 2nd stage than during 1st stage, though the callipers showed the fundus to retain its previous height.

These are the extremes of change in size and shape of the uterus, but the averages of the thirty cases show (1) the fundus to rise ·3 inches before birth, (2) the uterus to narrow laterally 1·1 inch before birth, and (3) the tape measurement from pubes to fundus to lessen 1 inch before birth.

The measurements with callipers from fundus to pubes show that the length of the parturient canal is not shortened before delivery occurs. The breadth of the uterus is shown to lessen, the organ getting narrower laterally as the leading parts of the child pass into the vagina. These first two measurements are direct. The third measurement, that with tape from pubes to fundus, shows indirectly that the uterus is narrowed antero-posteriorly as labour advances. For if the straight line from pubes to fundus, as measured by the callipers, remains constant or slightly lengthens, while the curve taken by the tape when in contact with the skin becomes less and less as the head descends into the perinæum, it is obvious that this can only be due to a shortening of the antero-posterior diameter of

the uterus, though the indirectness of this measurement renders it less exact, and consequently less valuable than the other two.

During labour, then, the uterus is narrowed both laterally and antero-posteriorly, though it is not reduced in length. Its cubic content, however, is considerably lessened as it loses its rotundity, becoming a mere elongated cylindrical body. The loss of cubic content is accounted for by (1) passage of part of the child from the uterus into the vagina; (2) by loss of liquor amnii.

It would have been easy to prepare a much more elaborate set of measurements, but the above seem amply to prove the exact points in question:—

1. That the fundus does not sink before the birth of the head.
2. That the uterus is narrowed during the 2nd stage, the fœtus being elongated and narrowed accordingly as its head enters the vagina.

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VI. A CLINICAL NOTE ON THE ADVANTAGES OF WALCHER'S POSITION IN DELIVERY.

By W. E. FOTHERGILL, M.A., B.Sc., M.B.

DURING the November, December, and January quarter just ended, Dr Stephen and I had six cases in which we employed the "Walcher'sche hängelage" with considerable advantage. Five of these may be briefly described as promontory projecting, justo-minor, or a combination of these conditions. In the sixth the pelvis was normal, but the head was very large. In all six the head failed to engage, and forceps were applied above the brim. In four of the cases the lateral posture was tried unsuccessfully, the lithotomy posture next failing, and delivery being effected only when the legs were allowed to hang down, the feet not touching the ground. In the two last cases the patient was put across the bed, and the legs allowed to hang before traction was begun. The measurements of pelves and heads are detailed below.

CASE I.—*Pelvis.*—Mrs C.: I.S., 8½ in.; I.C., 9½ in.; E.C., 9½ in.; D.C., 4 in.; T.C., 3¼ in.

Child.—5½, 5, 4½, 3⅝, 3¼ in.; length, 19 in.; living.

Four previous instrumental labours at full term,—2 dead and 2 living (Dr Croom, Dr Milne Murray).

CASE II.—*Pelvis.*—Mrs B.: I.S., 8½ in.; I.C., 9½ in.; E.C., 7 in.; D.C., 3⅞ in.; T.C., 3¼ in.
Child.—5½, 4¾, 3¾, 3½, 3 in.; length, 19 in.; weight, 6½ lbs.; dead.
Perinæum cut by traction rods when in lithotomy posture.

CASE III.—*Pelvis.*—Mrs D.: I.S., 9 in.; I.C., 10 in.; E.C., 7 in.; D.C., 4 in.; T.C., 3½ in.
Child.—Living. Measurements not obtained.

CASE IV.—*Pelvis.*—Mrs H.: I.S., 8¾ in.; I.C., 9½ in.; E.C., 7½ in.; D.C., 4 in.; T.C., 3½ in.
Child.—5½, 5, 4, 3½, 3 in.; length, 18 in.; weight, 7 lbs. 2 oz.; living.

CASE V.—*Pelvis.*—Mrs W.: I.S., 8 in.; I.C., 9 in.; E.C., 6⅝ in.; D.C., 3¾ in.; T.C., 3¼ in.
Child.—5, 4⅜, 3½, 3, 2¾ in.; length, 18 in.; weight, 5 lbs.; dead.
Induction of premature labour.

CASE VI.—*Pelvis.*—Mrs A.: I.S., 10 in.; I.C., 11 in.; E.C., 8½ in.; D.C., 4½ in.; T.C., 4 in.
Child.—5⅝, 5, 4, 3¾, 3¼ in.; length, 20½ in.; weight, 9 lbs. 5 oz.; living.

The table below shows the measurements of the diagonal conjugate taken in six cases under chloroform. Several measurements were taken without the aid of an anæsthetic, but these were of less value than the above. It was also found that in many women with full-sized pelves it was very difficult to get any measurement without chloroform. The figures show, however, that an increase in diagonal conjugate up to 1·2 cm. may be got by allowing the legs to hang, the average increase being ·93 cm. Walcher[1] estimates the increase at ·8 to 1·3 cm. Klein[2] allows only ·5 to ·6 cm.

Diagonal Conjugates taken in Lithotomy Posture and in Walcher's Position.

	Lithotomy.	Walcher.	Increase.
Williams, .	9·5 cm.	10·3 cm.	·8 cm.
Anderson, .	11·4 „	12·6 „	1·2 „
Costelloe, .	10·5 „	11·5 „	1 „
Watson, .	11 „	12 „	1 „
Tanner, .	11·2 „	12 „	·8 „
Dyce, . .	10·6 „	11·4 „	·8 „
		Average increase, .	·93 cm.

[1] *Centralb. f. Gynäk.*, 1889, s. 892.
[2] *Zeitschrift f. Geburtsh. Gynäk.*, Bd. xxi. s. 74.

Certain advantages were claimed for this position, or a similar one, many years ago by Sebastian Melli,[1] namely—

(1.) That certain malpositions were rectified by it, so that in this position the head would sometimes engage, though it had previously failed to do so.

(2.) That in fat women it aided delivery. Judging by Melli's figure, the feet were allowed to rest on the ground, so supporting the weight of the legs. This reduces his position to the ordinary dorsal posture, which, of course, is useful in certain malpositions, and specially so in cases of pendulous belly. He was probably quite innocent of any knowledge of the actual increase of conjugate got by using the weight of the legs.

Wehle[2] mentions the position as useful in delivering the after-coming head. Ahlfeld[3] recommends it in cases of flat pelvis, where, he says, it should be combined with the suprapubic pressure insisted on by Hofmeier.

The rationale of the increase in conjugate is found in the fact that the pelvic girdle can rotate about an axis passing through the two sacro-iliac joints. When the symphysis moves downwards in this rotation the conjugate is increased.

It may be said that the pressure of the head on the symphysis will cause this downward movement, and that thus the uterine contractions and the accessory powers pressing the head down will cause the enlargement of the conjugate in whatever position the patient may lie. This may be true, but why not save the uterus and abdominal muscles the trouble of pressing the symphysis down? For allowing the legs to hang, their weight, transmitted to the innominate bones mainly by the Y-shaped ligaments, is sufficient to cause the rotation described. Thus work is spared to the uterus and musculature generally, and pressure of the head on the symphysis is avoided.

Again, in those cases where traction is necessary, it may be said that the practitioner, pulling on the forceps, pulls down the symphysis, and so enlarges the conjugate. But why should he have the needless exertion of pulling down the symphysis when the weight of the legs will do it for him? Again, injurious pressure on head and on symphysis will be avoided.

So far we have considered only the effect on the bony pelvis of allowing the legs to hang. But there is another advantage in this position. It was noticed in one of the cases mentioned above, a primipara with a small vulvar aperture, that when pulling in the true axis of the pelvis—as indicated by the application handles—the traction rods pressed very strongly upon the perinæum. The patient was in the lithotomy posture, and the pressure was so great that the traction rods were seen to be cutting into the

[1] Seb. Melli, *La Comare Levatrice*, Venezia, 1738.
[2] *Archiv f. Gynäk.*, Bd. xlv. s. 323.
[3] *Lehrbuch d. Geburtshulfe*, p. 280.

perinæum on each side. When the legs were allowed to hang, so much skin was set free from the buttocks and other parts that this pressure on the perinæum was quite removed. The vulva was no longer stretched, and even at the escape of the head the lateral cuts made by the traction rods were not increased by tearing. In all subsequent cases, where there was any danger to the perinæum, the legs were kept extended at the hips, with the most satisfactory results. But the point is that in high forceps cases, Walcher's position saves the perinæum from undue pressure by the forceps as well as increasing the conjugate.

(*a.*) The conclusions, then, seem to be, that in high forceps cases Walcher's position is of advantage in saving—

1. The strength of the operator.
2. Pressure on the head.
3. Pressure on the pubic symphysis.
4. Pressure on the perinæum by the forceps.

(*b.*) That in cases not needing forceps, but where there is difficulty at the brim, this position saves—

1. Exertion to the uterus and abdominal muscles.
2. Pressure on head.
3. Pressure on the pubic symphysis.

(*c.*) That in all cases where the perinæum is in danger in delivery with or without forceps, this position, or at least extension of the legs at the hips, is of advantage in relaxing the integument and subjacent structures.

The President said the Fellows were indebted to Dr Fothergill for bringing the importance of Walcher's position in delivery before the Society, and especially the result of his own observations made at the Maternity Hospital. He asked to what extent the increase in the diagonal conjugate meant an increase in the true conjugate? A change in position that depressed the symphysis might increase the length of the diagonal without materially augmenting the available space in the brim. There was, however, no doubt that this change in position increased the space; the question was, how much?

Dr J. W. Ballantyne had been much interested in Dr Fothergill's contribution to the literature of Walcher's position and its effect upon the length of the conjugata vera. He had once unintentionally put a patient into that posture, and found unexpected benefit therefrom. It was a case of the induction of premature labour at seven and a half months for a contracted pelvis ($2\frac{1}{2}$ to $2\frac{3}{4}$ inches conjugate). After endeavouring for some time to extract the head in version with the patient in the lithotomy position, he had allowed the legs to hang down, and on then making further traction, he had been surprised to find the head slip through the narrow brim. He had not at the time known about Walcher's position.

Dr Fothergill replied.

VII. ON THE ACTION OF QUININE ON THE KIDNEYS AND GENITAL ORGANS DURING PREGNANCY.

By Georges Coromilas, of Calamata, Greece, M.D., Corresponding Member of the Obstetrical and Gynæcological Society of Paris.

(*Communicated by* Dr J. W. Ballantyne.)

Petitjean, in 1845, first stated that he had frequently seen abortion produced during the administration of quinine for intermittent fever, and Rodriguez first called in question Petitjean's assertion.

After the lapse of ten years, Dr John S. Wilson described the effect of quinine upon the uterus. In 1860, Dr T. H. Rich reported several cases of alarming uterine hæmorrhage checked by means of quinine. From this time, considerable attention was called to this question, until the publication of Monteverdi's elaborate article on the subject. He concluded that quinine was a trustworthy ecbolic and preferable to ergot, and should be given to pregnant women with caution. Monteverdi's paper called forth differences of opinion, especially from physicians practising in malarious districts. Some agreed with Wilson, Rich, and Monteverdi, while others contended that quinine possessed no property of stimulating into action the uterine muscular fibre. For this reason I present to the Obstetrical Society of Edinburgh four cases bearing upon this question which have occurred in my own practice. Before entering into details, I would say that the majority of the inhabitants of the prefectures of Laconia and Messina have a strong prejudice against the use of quinine during pregnancy and menstruation.

Case I.—Mrs V., of Piflos, 30 years of age, multipara, was eight months pregnant. In September 1888 she first consulted me, and stated that she had, months ago, had intermittent fever. When I saw her she was delicate, nervous, and anæmic, the liver a little hyperæmic, the spleen hypertrophic, the tongue a little sabural. I diagnosed the case as one of intermittent fever, and gave 24 grains of valerianate of quinine in ten doses, one to be taken every half hour. I saw her after she had taken three doses, and then she complained of pain in the renal and hypogastric regions, and all the symptoms of labour. I prescribed narcotics, but did not see her afterwards.

Case II.—Widow G., Calamata, Greece, 30 years of age, was six months pregnant. She was a delicate, nervous multipara. She had never aborted, nor had premature confinement. She consulted quacks in order to have abortion procured, but without success. In February 1894 I saw her. She had just had an attack of influenza, and this was followed by double broncho-pneumonia. For fifteen days I did not give her quinine; when she became

convalescent I gave her salicylate of quinine. On 20th February I prescribed 24 grains of salicylate of quinine, in ten doses, one to be taken every hour. After the third dose I found the patient in labour, the pains being regular and seemingly natural. I countermanded the rest of the quinine, and ordered opium or morphia, but the patient persisted in taking the quinine and refused to take the opium, and the following night she was delivered prematurely.

CASE III.—Mrs A., Calamata, Greece, 25 years of age, had had two children at full time. She was a delicate, nervous woman, but having no predisposition to abortion. On the 8th of April 1894 she was in the fourth month of her third pregnancy. There was slight pyrexia, but no physical signs of disease were discovered; but on the 9th of April, early in the morning, she took 20 grains of sulphate of quinine. In one hour after the dose she felt labour pains, which ended in abortion.

I have often administered 8 grains of quinine in three doses to pregnant women, one to be taken every half-hour or hour, and with the instruction that no further dose should be taken if pain set in. Some of these women did not appear to be affected by it. I have also observed that quinine, administered during menstruation, in some cases stops the flow, and frequently diminishes it. I conclude, therefore, that quinine has the property of exciting uterine contractions, and that these contractions are excited by it more readily in delicate, nervous, and anæmic women than in others. Quinine should, therefore, not be administered in large doses during pregnancy and menstruation, unless it be in conjunction with some narcotic which would prevent its action upon the uterus, and not at all in cases which do not urgently call for it.

CASE IV.—Miss El. Sp. Areoch, Calamata, Greece, was 23 years of age, and had menstruated regularly from the age of 14 till August 1893. Five years before, she suffered from hæmoglobinuria, and at that time had not taken quinine. One of her uncles died in 1893 from hæmoglobinuria caused by quinine. In April 1893 Dr Œconomopoulos prescribed for her pills of quinine and iron. She took these pills some days after her last menstruation, and the bleeding returned. The flow was pale, irregular, and accompanied by pain in the renal and hypogastric regions. It lasted twelve days. These symptoms she had not had previously. On the tenth day she ceased taking the pills. Six days after the hæmorrhage ceased she began the pills again, and the bleeding returned. Then they consulted another doctor, who gave some bitter drug, and the bleeding and pain continued in increased amount. After this I saw her, and found her pale, weak, anæmic, with a slow pulse, pains in the renal and hypogastric regions, and suffering from severe uterine hæmorrhage, which was stopped by the administration of antipyrine. During the three months that followed,

menstruation returned every twenty-seven or twenty-nine days. The flow was abundant, and lasted six or seven days. From that time until April 1894 it was regular in time, quantity, and duration. On 8th of April 1894 she had just menstruated, and by the order of her doctor took prepared quinquina wine, and she had began to drink of it on the 16th and 17th of April. On the 18th, menstruation returned, with pain, and lasted until the 22nd. It ceased when she abstained from taking the quinquina wine. On the 26th I saw her for pains. There was a little tenderness in the left ovarian region. On the 26th I prescribed for her the following mixture:—Citrate of iron, 2 grms.; Sulphate of quinine, 1 grm.; Water, 100 grms.; two or three teaspoonfuls to be taken in old brandy or in wine after each meal. On the 27th she took a teaspoonful after dinner and another after supper; on the 28th a teaspoonful twice. On the evening of that day she complained of pain in the renal and hypogastric regions. Medicine countermanded. On the 29th a teaspoonful at breakfast and after dinner. On the 30th a teaspoonful after breakfast, after dinner, and a tablespoonful after supper. On the 1st of May she complained of severe pain, and the medicine was countermanded. On the 3rd of May the medicine was taken again, and then, on the following day, she went into the country, and was advised to take a teaspoonful twice and a tablespoonful of the medicine once a day. On the 5th menstruation returned, abundant, and with severe pain. I ordered her 3 grms. of antipyrine in ten doses, one to be taken every half-hour until five doses had been taken, and the remainder every hour. The hæmorrhage then sensibly diminished, but the pain remained nearly the same, but during the action of the bowels the hæmorrhage returned, and the patient became dizzy and fell to the ground. The hæmorrhage continued for five days, and then ceased. On the 22nd of August I saw her again, and she said that her doctor in the country had prescribed a dose of quinine for her, and that this had brought on the pain in the back and bleeding. She complained then of some pain in the renal region. On palpation nothing abnormal could be discovered. Sulphate of quinine, 0·40 grms. in three doses, one to be taken every half-hour, was prescribed. After this the pain in the renal region increased. On the 23rd she was better. On examination the hymen was intact, and nothing abnormal could be discovered.

VIII. *Dr Ballantyne* also communicated the following NOTE OF A GUNSHOT WOUND OF THE ABDOMEN—WONDERFUL RECOVERY, by *Dr J. K. King*, New York:—

On Sunday afternoon, August 26th, 1894, during a quarrel, an Italian, F. R., aged 31, was shot in the abdomen. The weapon was a 32 calibre revolver. The bullet entered the abdomen $1\frac{1}{2}$ inch below the umbilicus, and $\frac{1}{2}$ inch to the right of the median line. Dr M. L. Bennett was called to see the case. The patient

was brought to his house, a distance of two miles. I was called to assist Dr Bennett in the operation. The patient was very feeble; respirations 40, pulse quick and very weak, pale face, and great pain in the abdomen was complained of. The surroundings were about as unfavourable for aseptic precautions as could be found anywhere. Hasty preparations were made, water boiled, and the hands, instruments, and dressings rendered as aseptic as possible. The anæsthetic was given quickly and the abdomen opened. It was found completely filled with blood and blood-clots. The blood and clots were removed, the bowels lifted out and laid on sterilized towels, and search made for wounds. Sixteen bullet holes were found in the cæcum, ilium, and jejunum. These were carefully closed with catgut. The Lembert sutures were used. The abdomen was thoroughly flushed with warm sterilized water, the bowels carefully replaced. The abdomen was closed in the usual way, and a gauze drain left in the lower end of the wound. Morphine was used and the diet kept low. The patient made an uninterrupted recovery. The bowels moved on the fourth day after the operation, and quite regularly afterwards. On the seventeenth day the patient sat up, and went to work on the forty-seventh day after the injury.

MEETING VI.—MAY 8, 1895.

DR A. H. FREELAND BARBOUR, *President, in the Chair.*

I. B. W. Broad, M.B. C.M., City Hospital; Edwin Hindmarsh, M.B. Ed., 59 Gilmore Place; and Patrick Mackin, L.R.C.P. & S. Ed., Wellington, New Zealand, were elected Ordinary Fellows of the Society.

II. *Dr Felkin* showed an ASEPTIC SPONGE-HOLDER.

III. *Dr Fordyce* showed a RETAINED DEAD FŒTUS.

IV. *Dr J. W. Ballantyne* exhibited a FŒTUS IN A STATE OF PARTIAL MUMMIFICATION AND FLATTENING, which had been sent to him by his friend Dr Albert E. Morison of Hartlepool. It was from a case of twins, and the fœtus compressus with its placenta came away first. The other twin, a full-sized healthy female child, was born a few minutes later. It presented by the breech, and its placenta was so adherent that it had to be scraped away. About five months ago the mother had a great deal of hæmorrhage, and an abortion threatened. Doubtless at that time the fœtus compressus died, being retained thereafter *in utero*, and gradually compressed by the living twin till it was expelled along with it at the full term.

V. *Dr Buist*, Dundee, showed a FŒTUS COMPRESSUS.

VI. *Dr Matheson Cullen* showed a DIMIDIATE PLACENTA.

VII. ON THE INFLUENCE OF THE REMOVAL OF THE OVARIES ON METABOLISM.

By EMILIO CURATULO, Professore pareggiato di Ostetricia e ginecologie; and LUIGI TARULLI, Quito alla Cattedra di Fisiologie.

(*Communicated by* Dr A. H. FREELAND BARBOUR.)

THE starting-point of these researches is the now undisputed clinical fact that patients suffering from osteo-malacia can be cured by the removal of the ovaries. But the different theories propounded to explain this fact are not based upon arguments having their foundation in strict scientific research. Also Fehling's hypothesis, according to which by removal of the ovaries a *stimulus* is removed, which, acting on the vaso-dilator nerves of the bones, would cause passive hyperæmia, an accumulation of carbonic acid, and consequently reabsorption of earthy salts, is an hypothesis that may appear ingenious and perhaps even be true, but it cannot be said to be supported by indisputable facts scientifically proved. Nevertheless further researches have succeeded not only in throwing clearer light on this disputed point, but they have even gone so far as to deny to castration any therapeutic value.

We know, in fact, Petrone's studies, which tend to demonstrate that the good effects upon the disease are only due to the chloroformisation rather than to the removal of the ovaries, and a new voice of protest has been raised against this operation, which has been really abused, having been carried out in cases where it was not advisable.

It seemed to us that an accurate and profitable study upon the action of the removal of the ovaries in cases of osteo-malacia could not be made without first studying the changes which take place in the metabolism after castration in healthy conditions. It is a well-known fact in rural economy that animals when castrated get fat; but a scientific investigation for the purpose of ascertaining the reason of this abnormal accumulation of fat in the system, and the eventual changes in metabolic activity, of respiration, and the composition of urine after such operation, has never been accomplished.

We therefore thought that it would be useful before undertaking an experimental study upon osteo-malacia, in accordance with the new scientific ætiological views, to fill this gap. Our work upon the subject, which will shortly be published in full, has not been fruitless.

In this preliminary note our sole object is that of calling attention only to one fact of modified metabolism after castration, which seems to be of no small importance in explaining the useful

therapeutical aid which is afforded in mollities ossium by the removal of the ovaries.

Having kept the animals (bitches), upon which we made these researches, on constant diet previous to the castration, so as to have an almost constant average in the discharge of nitrogen and phosphates, after the removal of the ovaries we have observed that the quantity of phosphoric anhydride discharged through the urine is considerably and for a long time diminished. Thus in a bitch, in which before the castration we had a daily average of *gm.* 9·93 of nitrogen and *gm.* 1·50 of phosphoric anhydride, after the operation, having continued the daily examination for a period of about three months (85 days), we found that while the average of nitrogen discharged remained about the same, that of phosphoric anhydride decreased to *gm.* 0·75.

It is important to note that this remarkable decrease takes place with considerable rapidity after the operation. In fact, in another bitch in which we obtained the healing of the wound in three days, having again commenced the daily examination of urine after six days, we began at once to notice the decrease in the discharge of phosphates.

Now the importance of this fact no one can really fail to notice. However unsettled the pathogenesis of osteo-malacia still is, there is no doubt that we obtain by it a considerable decrease of the earthy salts composing the bones, so that these lose the natural solidity, bending in those parts of the skeleton which bear the greater strain. On the other hand, it is known that the phosphates contained in the urine are partly derived from the food eaten, partly from the products of waste of the tissues, which contain phosphoric organic substances (lecytines, nucleines, iecorines), and mostly from the discharge of the earthy phosphates contained in the bones. Now, as the feeding of animals experimented upon remains the same before and after castration, we are induced to believe that the decrease in the elimination of the phosphates must not depend upon the introduction of a smaller quantity of them through the food, but upon a diminished oxidation of phosphorus existing in an organic form in the tissues, which being stored by the system, and combining itself with calcium and magnesium, would accumulate in the bones in the form of phosphate of calcium and magnesium.

It seems to us, therefore, that on the strength of the results obtained in our researches, we may state that the removal of the ovaries in osteo-malacia proves advantageous,—not, as claimed by Petrone and others, solely on account of the chloroformisation, which would kill the *fermentum nitricum* that this observer holds to be the cause of the disease, nor as claimed, on the other hand, by Fehling, according to whom the ovary represents the *stimulus* which determines the mollities ossium, but for a different reason altogether.

We admit that the ovaries have, like the other glands of the animal economy, according to the general doctrine of Brown-Séquard, a kind of internal secretion,—that is to say, that they continually introduce into the blood a secretive product, the chemical constitution of which is still unknown, capable of facilitating the oxidation of the phosphoric organic substances which supply the material for forming the salts of the bones. It results, therefore, that by the removal of these glands there must be a greater retention of organic phosphorus, consequently a greater accumulation of earthy salts in form of phosphates until the skeleton finally resumes its normal solidity. This, our theory, may perhaps be extended (we only mention this incidentally, because we have not completed the experiments relating thereto) to what concerns the waste or the combustion of the fat, to explain the well-known phenomenon of fattening following castration, and perhaps also that which is very often noticed in the menopause and in sterile women.

The President said there could be but one opinion with regard to the paper by Prof. Curatulo. It was a communication of great value, as it placed on an experimental basis a new view as to the functions of the ovary. If this should be established by further experiment, it would have a wide bearing, especially on the changes at the menopause.

Prof. Simpson agreed with the President in regarding the communication which he had just read as one of great interest and value. The results of the experiments of Prof. Curatulo and Dr Tarulli would prove of high importance, not only in regard to the relations of oöphorectomy and malacosteon, but also as to the general question of the probable secretion from the ovaries of some ingredient that was capable of modifying the general metabolism. He (Prof. Simpson) had published in the volume of the *Edinburgh Hospital Reports* for 1894 a paper describing a case illustrative of the influence of double ovariotomy on the tendency to the development of cancer. The proportion of women dying of carcinosis after ovariotomy was very notable, and it was especially great where both ovaries had been removed. A study of Sir Spencer Wells' statistics showed that patients who had been subjected to ovariotomy were at least six times more liable to cancer than other women; and that in the cases where cancer supervened double ovariotomy had been performed in the proportion of 19 per cent., whilst among the patients that remained free from cancer the proportion of double ovariotomies had been only 7½ per cent. It might be that patients with ovarian cystoma might be of a cancerous diathesis; possibly some of the epithelial elements left in the body during the operation might be the starting-point of the malignant development. But Dr Curatulo's communication had confirmed him in the impression expressed in

the paper referred to, that the tendency to cancerous development in these women might be due to the absence from the system of the ovarian internal secretion.

Dr Felkin said this paper upheld his theory of the "internal" secretion of the ovaries, testicle, etc. He had seen various cases of women who had had double ovariotomy performed, and had suffered in consequence from various psychical effects each month, where the administration of ovarian extract had brought about a cure.

Dr Buist, Dundee, said the stated fact that women after ovariotomy are specially liable to rheumatoid arthritis would also come within the range of the question raised in this paper. Another point which had as yet only been touched, was that of the substitution of the internal secretion of one gland for that of another. Acting on that idea, he had been treating a case of climacteric obesity with thyroid extract, and the woman's weight had decreased steadily to the extent of 56 lbs. in six months, no other treatment being used.

Dr T. J. Fordyce Messer, Helensburgh, said that he had listened with pleasure to the paper, and he might mention a case of a middle-aged man, who was very fat, inclined to go to sleep in driving his horses, and who had œdema of the legs, with erysipelatous rash over the shins and calves, where thyroid feeding with iron had greatly reduced the fatty tissue and relieved his breathing, which was laboured. He could not but think, however, that removal of the ovaries was resorted to too freely; and on sending patients to specialists, some refused to operate, while others did so without hesitation. He maintained it was a very serious matter to unsex a woman in this way without everything else being tried, and instanced a case told him by a medical man whose wife before marriage suffered greatly at her menstrual periods, and that at the first menstrual period after marriage the suffering was most intense. She then conceived, and has had a large family, and does not suffer from any uterine complaint.

VIII. *Dr J. A. C. Kynoch*, Dundee, read the following paper on A CASE OF VESICO-VAGINAL FISTULA FROM AN UNUSUAL CAUSE:—

Vesico-vaginal fistula being usually due to injury during labour, or malignant disease, with ulceration from a badly-fitting pessary, diphtheritic inflammation during the puerperium, or calculi ulcerating through the bladder wall, as more unusual causes, the following case is, I think, of sufficient interest, from an etiological point of view, to warrant my bringing it before the notice of the Society.

Mrs B., 55, shopkeeper, was admitted into the Dundee Royal Infirmary in April 1894, under the care of Dr Templeman, who has kindly given me permission to read the notes of the case.

She complained of inability to retain urine, of two months'

duration. Her general health had always been good; menstruation began at 14, twenty-eight-day type; menopause at 45; married when 21. She had nine children; the youngest twelve years ago. One still-born child at the eighth month. No miscarriages. All her labours were easy and non-instrumental. She stated that two days after her second confinement she jumped out of bed to lift a child, and attributes the commencement of what she described as a "falling down of the womb" to this exertion. This, however, did not give her much trouble at the time. From her occupation as a shopwoman she had a great deal of standing work, which she thought was the cause of increasing inconvenience from this condition during the previous eight years. She stated that the "swelling" always came down when walking, or straining at stool, but disappeared on resting. She never wore a pessary, and she never complained of any bladder or rectal trouble. Three months before admission to the Infirmary, when descending an outside wooden stair covered with ice, she slipped and fell on her back, sliding down several steps. Previous to this accident she had been at work in a standing position for several hours, during which time she had not passed urine, and she felt the swelling before complained of protruding at the vulva. She was able to rise, but felt sick, and complained of a good deal of pain about the vulva. There was some hæmorrhage, but no urine came away at the time. The hæmorrhage continued for three days, and she complained for the first time of pain on micturition, which lasted for several days; but did not complain of anything unusual otherwise. She remained in bed for a few days, and then continued working for a month, when for the first time she noticed dribbling of urine, especially when walking. At first the incontinence was so slight that she did not pay much attention to it; but as it became more troublesome, and prevented her from walking with any comfort, she again took to her bed. At first she could retain the urine for some time when resting, but later the incontinence became constant, the urine coming away, as she described it, with a gush from the vagina, especially when she stooped to lift anything.

On examination there was found marked prolapse of the anterior vaginal wall, and about 1 inch inside the ostium vaginæ; and in the middle line there was noticed a cleft about the size of a sixpence, surrounded by a good deal of cicatricial tissue, and communicating directly with the bladder. There was very marked urinous odour, and a good deal of irritation of the skin round the vulva. The vagina was douched twice daily, and ten days after admission the edges of the fistula were pared and sutured. The stitches (silkworm gut) were removed on the tenth day. A fortnight later urine was again noticed to pass from the vagina, and on examination a small cleft was found in the upper margin of the fistula. This was again stitched, and there was no further

passage of urine from the vagina when the patient left the Infirmary three weeks later.

It would appear that this woman had suffered from incomplete prolapse, with slight degree of cystocele, for eight years, and that on the day of the accident the latter condition had become aggravated on account of her not having passed urine for several hours previously, and also from the exertion of several hours' work in the standing posture; that the prolapsed portion had been injured by the fall, as indicated by the hæmorrhage, and that ulceration through the bladder wall had subsequently occurred, as shown by the passage of urine per vaginam one month after the accident.

IX. THE BIDDENDEN MAIDS.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E.

Nearly every country has had a national teratological phenomenon; but some parts of the world, such as Bohemia, have had an unenviable notoriety as the nurseries of "freaks" and curiosities. Many of these national terata are well known,—such as the Scottish brothers, the Irish giant, the North Carolina twins, the Hungarian sisters, the Siamese twins, and the Tocci boys; but amongst those whose fame is less widespread must be reckoned the Biddenden Maids of Kent in England. The Biddenden Maids resembled the Scottish brothers in several respects: they both belonged to the group of the disomatous or double terata, they both lived for a considerable number of years, and they both occurred so long ago that our knowledge of them is founded upon purely popular reports, and not upon scientific or medical investigation. With regard to the Scottish brothers I shall have something to say on another occasion; in the meantime, it will be interesting to gather together what has been written concerning the Biddenden Maids.

Biddenden is a small town, of about 1400 inhabitants, situated in the county of Kent, about four miles from Tenterden, and not far from Cranbrook. Here, in the year 1100, it is stated that two girls joined together in a curious way were born to fairly wealthy parents. They were named Eliza and Mary Chulkhurst. They lived, joined together, for thirty-four years, when (*i.e.* in 1134) one was taken ill and died. It was proposed to the survivor that she should be separated from her dead sister, but she refused, and died also about six hours later. They were buried in their native village, and in the Biddenden church a stone marked with a diagonal line, and situated near the rector's pew, is shown as the place of their interment. Doubtless the Biddenden Maids would have been forgotten centuries ago had it not been for a very curious bequest contained in their will. To quote from a "broadside" printed in the last century: "By their Will, they bequeathed to the Churchwardens of the Parish of Biddenden, and their suc-

cessors Churchwardens for ever, certain pieces or parcels of Land in the Parish of Biddenden, containing twenty Acres, more or less, which now lets at £31, 10s. per Annum. There are usually made in commemoration of these wonderful Phœnomena's of Nature about 1000 Rolls with their impression printed on them, and given away to all Strangers, on Easter Sunday, after Divine Service, in the Afternoon, also about 270 Quartern Loaves, and Cheese in proportion, to all the poor Inhabitants of the said Parish."

A writer in *Notes and Queries* (6th series, iii. p. 246, March 27, 1875) gives some further information regarding the Biddenden bequest. "On Easter Monday, at Biddenden, near Staplehurst, Kent, there is a distribution, according to ancient custom, of 'Biddenden Maids' cakes,' with bread and cheese, the cost of which is defrayed from the proceeds of some twenty acres of land, now yielding £35 per annum, and known as the 'Bread and Cheese Lands.' About the year 1100 there lived Eliza and Mary Chulkhurst, who were joined together after the manner of the Siamese twins, and who lived for thirty-four years, one dying, and then being followed by her sister within six hours. They left by their will the lands above alluded to, and their memory is perpetuated by imprinting on the cakes their effigies 'in their habit as they lived.' The cakes, which are simple flour and water, are four inches long by two inches wide, and are much sought after as curiosities. These which are given away are distributed at the discretion of the Churchwardens, and are nearly 300 in number. The bread and cheese amounts to 540 quartern loaves and 470 lbs. of cheese. The distribution is made on land belonging to the charity known as the Old Poorhouse. Formerly it used to take place in the Church, immediately after the service in the afternoon; but in consequence of the unseemly disturbance which used to ensue, the practice was discontinued. The Church used to be filled with a congregation whose conduct was occasionally so reprehensible that sometimes the churchwardens had to use their wands for other purposes than symbols of office. The impressions of the 'maids' on the cakes are of a primitive character, and are made by boxwood dies cut in 1814. They bear the date 1100, when Eliza and Mary Chulkhurst are supposed to have been born, and also their age at death, thirty-four years."

Being anxious to learn more about this interesting national teratological record and to see one of the cakes, I wrote to Dr H. H. Bate, at present practising in Biddenden, asking him for information. Dr Bate was kind enough to obtain one of the cakes for me, and with it he sent the "broadside," a photograph of which is here reproduced (*vide* Plate I). He also supplied me with an extract relating to the Biddenden Maids from E. Hasted's *History of the County of Kent*, published in 1798, as well as with drawings of the Maids, one from Ducarel's *Repertory of the Endowments of Vicarages in the Diocese of Canterbury and Rochester*, 1782, and the

other from Hove's *Every Day Book*, ii. p. 443, 1838 (*vide* Plate II., Figs. 1 and 2).

With regard to the cake, it is made evidently of simple bread dough, and has somewhat the colour of shortbread. It measures $3\frac{3}{4}$ inches in length, $1\frac{7}{8}$ inch in breadth, and nearly $\frac{1}{2}$ inch in thickness. On one side is the representation of the Maids in relief, with the words "Elisa & Mary Chulkhurst" above, and "Biddenden" below. On the skirt of the dress of one of the Maids is printed "IN 1100," whilst on that of the other is "A 34 Y"; this may be taken as meaning that they were born in 1100, and lived to the age of thirty-four. The impression resembles most closely that given in Hove's *Every Day Book* (Plate II., Fig. 2), differing from it only in one or two minor details. Dr Bate tells me that there are two stamps at the baker's, the one used for the cake being the older (probably 150 years old), whilst the other is of much more recent date; they differ greatly in details. The impression represents the Maids as being closely united at the shoulders and at the hips, but separate in the interval between, as having remarkably prominent mammæ, and as being provided with two feet each.

The picture on the "broadside" is different in some points from that on the cake. In it the artistic touch is not wanting, and the Maids are represented as elegantly clad in the costume of the time of Mary I., with open bodices, vandycked ruffs, sleeves slashed at the shoulders, and the picturesque head-dress of the age. The mammæ are modestly covered and the arms are raised from the sides (Plate I). The same words occur, and the same lettering on the Maids' skirts. The accompanying letterpress gives the graphic account of their death:—"They lived together in the above state Thirty-four years, at the expiration of which time one of them was taken ill and in a short time died; the surviving one was advised to be separated from the body of her deceased sister by dissection, but she absolutely refused the separation by saying these words,—'As we came together we will also go together,'—and in the space of about six hours after her sister's decease she was taken ill and died also." Then follows the account of the bequest, to which reference has already been made.

Before passing to the consideration of the teratological aspect of the Biddenden Maids, I may quote what Hasted says of the Charity in his *History of the County of Kent*. "Twenty acres of land, called the Bread and Cheese Land, lying in five pieces, were given by persons unknown, the yearly rents to be distributed among the poor of this parish. This is yearly done on Easter Sunday in the afternoon, in 600 cakes, each of which have the figures of two women impressed on them, and are given to all such as attend the church; and 270 loaves, weighing three pounds and an half a-piece; to which latter is added one pound and an half of cheese, are given to the parishioners only, at the same time. There is a vulgar

PLATE I.

A SHORT AND CONCISE ACCOUNT OF

ELIZA AND MARY CHULKHURST.

Who were born joined together by the Hips and Shoulders,

IN THE YEAR OF OUR LORD 1100.

At BIDDENDEN, in the County of KENT,

COMMONLY CALLED

THE BIDDENDEN MAIDS.

THE READER will observe by the Plate of them, that they lived together in the above state Thirty-four years, at the expiration of which time one of them was taken ill and in a short time died; the surviving one was advised to be separated from the body of her deceased Sister by dissection, but she absolutely refused the separation by saying these words.—"As we came together we will also go together,"—and in the space of about Six Hours after her Sister's decease she was taken ill and died also.

By their Will they bequeath to the Churchwardens of the Parish of Biddenden and their successors Churchwardens for ever, certain Pieces or Parcels of Land in the Parish of Biddenden, containing Twenty Acres, more or less, which now let at 40 Guineas per annum. There are usually made, in commemoration of these wonderful Phenomena of Nature, about 1,000 Rolls with their Impression printed on them, and given away to all strangers on Easter Sunday after Divine Service in the afternoon; also about 500 Quartern Loaves and Cheese in proportion, to all the poor Inhabitants of the said Parish.

PLATE II.

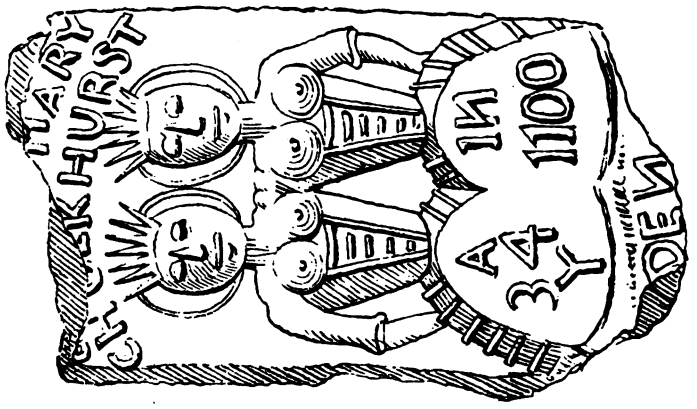

Fig. 2.

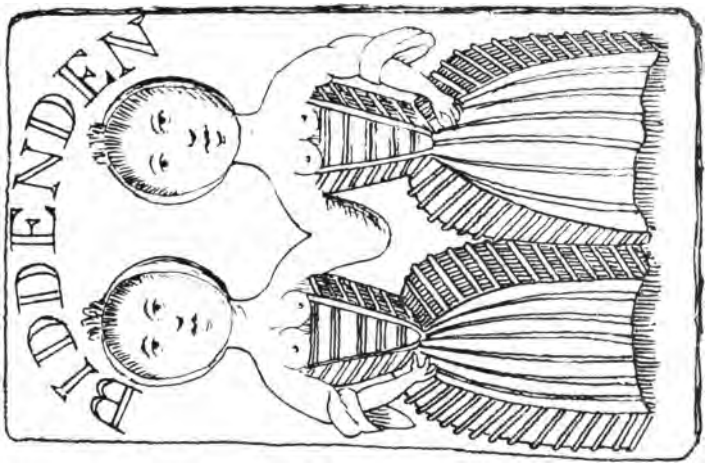

Fig. 1.

tradition in these parts, that the figures on the cakes represent the donors of this gift, being two women, twins, who were joined together in their bodies, and lived together so till they were between twenty and thirty years of age. But this seems without foundation. The truth seems to be, that it was the gift of two maidens of the name of Preston; and that the print of the women on the cakes has taken place only within these fifty years, and was made to represent two poor widows, as the general objects of a charitable benefaction. William Horner, rector of this parish in 1656, brought a suit in the Exchequer for the recovery of these lands, as having been given for an augmentation of his glebe land; but he was non-suited."

R. Chambers, in his *Book of Days* (vol. i. p. 427), follows Hasted in his attempt to discredit the popular belief in the Biddenden Maids and their bequest, and suggests that the existence of twin sisters united not indeed by bodily union but by a community of tastes and affections, may have given rise to the tradition. This suggestion leads me now to discuss the question whether we have here to do with a genuine record of a teratological phenomenon or merely with a fabulous tale.

It may be urged that the date fixed for the birth of the Biddenden Maids is so remote as to throw grave doubt upon the reality of the occurrence. The year 1100 was, it will be remembered, that in which William Rufus was found dead in the New Forest, "with the arrow either of a hunter or an assassin in his breast." According to the *Anglo-Saxon Chronicle* several "prodigies" preceded the death of this profligate and extravagant monarch. Thus it is recorded that "at Pentecost blood was observed gushing from the earth, at a certain town of Berkshire, even as many asserted who declared that they had seen it. And after this, on the morning after Lammas Day, King William was shot."[1] Now it is just possible that the birth of the Biddenden Maids may have occurred later, but have been antedated by popular tradition to the year above mentioned. For such a birth would, in the opinion of the times, be regarded undoubtedly as a most evident prodigy or omen of evil. Still, even admitting that the date 1100 must be allowed to stand, its remoteness from the present time is not a convincing argument against a belief in the real occurrence of the phenomenon; for of the dicephalic Scottish brothers, who lived in 1490, we have credible historical evidence. Further, Lycosthenes, in his *Chronicon Prodigiorum atque Ostentorum* (p. 397), published in 1557, states, upon what authority I know not, that in the year 1112 joined twins resembling the Biddenden phenomenon in all points save in sex were born in England. The passage is as follows:—"In Anglia natus est puer geminus a clune ad superiores partes ita divisus, ut duo haberet

[1] *The Anglo-Saxon Chronicle* (Bohn's Antiquarian Library), p. 476, 1884.

capita, duo corpora integra ad renes cum suis brachiis, qui baptizatus triduo supervixit." It is just possible that in some way or other this case has been confounded with the story of Biddenden; at any rate, the occurrence of such a statement in Lycosthenes' work is of more than passing interest. Had there been no bequest of land in connexion with the case of the Kentish Maids, the whole affair would probably soon have been forgotten.

There is, however, one real difficulty in accepting the story handed down to us as authentic,—the nature of the teratological phenomenon itself. All the records agree in stating that the Maids were joined together at the shoulders and hips, and the impression on the cakes and the pictures on the "broadsides" show this peculiar mode of union, and represent the bodies as quite separate in the space between the above-named points. The Maids are shown with four feet and two arms, the right and left respectively, whilst the other arms (left and right) are fused together at the shoulder according to one illustration, and a little above the elbow according to another. Now, I do not know of any modern case of double monstrosity showing this peculiar mode of union; but it may be that, as Prof. A. R. Simpson has suggested, the Maids had four separate arms, and were in the habit of going about with their contiguous arms round each other's necks, and that this gave rise to the notion that these limbs were united. If this be so, then the teratological difficulty is removed, for the case then becomes perfectly comparable with the well-known but rare type of double terata known as the pygopagous twins, which is placed by Taruffi[1] with that of the ischiopagous twins in the group dicephalus lecanopagus. Similar instances, which are well known to students of teratology, are the Hungarian sisters (Helen and Judith), the North Carolina twins (Millie and Christine), and the Bohemian twins (Rosalie and Josepha Blazek).

Pygopagous twins are fœtuses united together in the region of the nates, and having each its own pelvis. In the recorded cases the union has been usually between the sacra and coccyges, and has been either osseous or (more rarely) ligamentous. Sometimes the point of junction was the middle line posteriorly, at other times it was rather a postero-lateral union; and it is probable that in the Biddenden Maids it was of the latter kind, and it is likely, from the proposal made to separate the sisters after the death of one, that it was ligamentous in nature.

If it be granted that the Biddenden Maids were pygopagous twins, a study of the histories of other recorded cases of this monstrosity serves to demonstrate many common characters. Thus of the eight cases which Taruffi has collected, in seven the twins were female; and if to these we add the sisters Rosalie and Josepha Blazek and the Maids, we have ten cases, of which nine

[1] Taruffi (C.), *Storia della Teratologia*, ii. p. 395, 1882.

were girls. Again, several of the pygopagous twins of whom there are scientific records survived birth and lived for a number of years, and thus resembled the Biddenden terata. Helen and Judith, for instance, were 23 years old at death, and the North Carolina twins, although born in 1851, are still alive.[1] There is, therefore, nothing inherently improbable in the statement that the Biddenden Maids lived for thirty-four years. With regard also to the truth of the record that the one Maid survived her sister for six hours, there is confirmatory evidence from scientifically observed instances, for Joly and Peyrat (*Bull. de l'Acad. de Méd.*, iii., Jan. 20, 1874) state that in the case seen by them, the one infant lived ten hours after the death of the other.

It is impossible to make any statement with regard to the internal structure of the Maids, or to the characters of their genital organs, for there is absolutely no information forthcoming upon these points. It may simply be said in conclusion, that the phenomenon of Biddenden is interesting not only on account of the curious bequest which arose out of it, but also because it was an instance of a very rare teratological type occurring at a very early period in our national history.

MEETING VII.—JUNE 12, 1895.

DR A. H. FREELAND BARBOUR, *President, in the Chair.*

I. The following gentlemen were duly elected Ordinary Fellows of the Society:—G. Edgar Helme, M.B. C.M., Maternity Hospital, Edinburgh; P. T. Hughes, M.B. C.M., Maternity Hospital, Edinburgh.

II. *Dr James Ritchie* showed TWO SUPERNUMERARY DIGITS which he removed from a male child on the third day after birth. Each digit was 2 cms. long, and sprang from a similar position on the two hands, viz., from the middle of the ulnar aspect of the proximal phalanx of the little finger. There was a small nail on each. On longitudinal section of one of the digits it was seen to consist of two phalanges; a considerable amount of fat was found in the pulp of the terminal phalanx in front of and under the nail. Each digit was attached by a comparatively small pedicle without joint. Two horse-hair sutures were required for the one, three for the other; and the wounds were sealed up by means of sublimated wadding and collodion.

[1] J. M. Rodriquez gives an account of Millie and Christine, as examined by him in Mexico in 1894.—*Gaceta Médica de Mexico*, p. 295, Aug. 1, 1894.

III. CHOREA GRAVIDARUM: A STATISTICAL REVIEW OF THE PUBLISHED CASES.

By R. C. Buist, M.D., Dundee.

My attention was directed to the literature of Chorea Gravidarum by the occurrence in my practice of the case of B. M., related below; and inasmuch as the result of a rapid survey was the discovery (1) that it was very rare, and the patients mostly died or became insane, and (2) that there was not since Barnes's paper in 1869 any fairly complete and trustworthy account of the subject in English, I thought it might be of some interest if I placed the result of my reading before you. The published cases have from time to time been tabulated by successive authors in various countries, but in very few instances has the writer gone over the original records; for the most part he has incorporated the last published table *in toto* with the results of new cases, and thus any error in the record or transcription of the original notes has been re-embodied in the new table. The net result is that in an authoritative table such as that of Charpentier (*Traité des Accouchements*, 2nd ed., i. p. 875), cases are included which are not chorea, and the same case is repeated, misquoted from a different source under the name of a non-existent author.

So far as they were accessible to me, I have gone over the original records, a business which the popular art of inaccurate reference made not without labour, and in the tabular statement which I have given, each case in which I have not seen the record quoted is marked with an asterisk, so that in the event of any one wishing to work again over the literature of this subject, he will see at once the points at which my statement is likely to be deficient.

Rarity of Chorea Gravidarum.—Though so rare that the publication of a few fresh cases may affect the statistical prognosis, and though several obstetricians in large practice have seen very few cases (Spiegelberg 3, Charpentier 3, E. Martin 2), others have been more favoured. Thus in 1884 Pinard had seen 8 cases; Litten, 1886, says they had observed 25, of which 11 and a puerperal case are individually noticed in his paper; and in the yearly volumes of the *Charité Annalen* I find in the reports of the Geburtshülfliche Klinik notes of 10 cases not otherwise published. Friis gives the following statistics from the sixth division of the Kommunehospitalet at Copenhagen:—From 1870-1890 they had 93 choreic patients, of whom 6 males and 28 females were over 15 years of age. Of these, 8 were pregnant and 1 recently delivered. Four were in I. pregnancy, 3 in II., of whom 2 had chorea in their first pregnancy, and 1 in the III., who had not previously been affected. The periods of onset were—first month, 2; second month, 2; third, fifth, and seventh months and fourteen days ante-partum respectively.

I shall, in the first place, give the history of my own case, and of five others hitherto unpublished, which, by the kindness of several friends, I am enabled to include in this report. To these gentlemen I wish here to express my gratitude for the readiness with which they placed their notes at my disposal; and also to Drs Maurice Davis, Dobie, Benthall, Treharne, and Pearse for answering my questions with regard to their published cases.

CASE I.—(R. C. Buist, M.D., Dundee.)—*Pregnancy; Exposure to Damp; Sudden Severe Chorea; Spontaneous Delivery at Term; Recovery.*

January 16, 1895.—B. M., aged 21, married, came to engage me for her confinement. I noticed that she was very restless, jerking her head from side to side and up and down, advancing, withdrawing her feet under her chair, lifting her arms jerkily about, fumbling with her fingers,—presenting, in short, well-marked typical chorea. This had been present one day only.

Family History.—Father (62) alive and well. Mother died of heart disease four years ago. She had fits, and her front teeth were extracted because she bit her tongue. Of nine children four are alive. Elder sister well, but has "turns" when she has her children (hysteric).

Personal History.—Had some skin disease at 14. Menstruation from 16 always irregular. Four years ago had her arm hurt in factory, and had a "fit," in which she lay quite still. This lasted two hours. No chorea or rheumatism; was always nervous.

First pregnancy, at 20, aborted in third month after heavy lift. She is now (January 1895) seven months pregnant, and has suffered greatly from sickness, which still persists. She sometimes rejects everything taken. For two weeks she has had some diarrhœa.

January 15.—She carried some wood a considerable distance in the wet. During the night she was very restless, and had a "fit," during which she was quite conscious, and clutched things with her hands. Next day she had three similar turns before she came to me. She has been very sleepless for some time. She had three more fits during night.

January 17.—Chorea is much worse. There is some difficulty in giving food or medicine from the way in which the teeth snap on the spoon.

January 18.—Under Sod. salicyl. gr. 5, Pot. bromid. gr. 10, every hour, she slept at intervals through the night, but was restless. Chorea is severe. She is tossed from side to side of the bed, and has to be kept off the wall by pillows. Enema with chloral hydrate 3j. made her quieter.

January 20.—Salicyl. gr. 10, Bromide gr. 20, every four hours are giving her a little sleep in snatches. Chorea is less severe.

The diarrhœa has almost ceased under the use of Ext. opii., gr. 1, when required. There is a trace of albumen in the urine.

January 22.—Walked across the floor. Salicylate stopped.

January 25.—Can use her hands better.

February 5.—Chorea exaggerated. Pot. brom., which she has omitted since January 24, resumed for a few days; after which she rose at times.

February 15 *and* 17.—Fell off a chair. Chorea worse.

February 19.—Sleepless. Bromide resumed.

February 28.—Much better. Does her work fairly well. Twitching still general, but most marked in left hand, in which she has less power. She still makes an occasional clucking or a whistling noise, but the chorea is slight.

March 3.—Spontaneous delivery; child female, medium size. During labour the choreic movements were exaggerated at the end of each pain.

March 5.—Child had two slight fits to-day. Meconium is of normal colour, but much firmer than usual. The mother's chorea is much less; the movements are rare, except in the hands.

March 11.—Sitting at the fire. Occasional spasmodic contraction of the fingers is the only noticeable peculiarity.

April 1.—Except on very careful observation, she shows no sign of chorea. There is, however, an occasional twitch of the fingers.

May 7.—Child had abdominal pain and four slight convulsions of left side and face. Mother is excited, and exhibits twitching of the fingers and an occasional grimace.

CASE II.—(J. Halliday Croom, M.D., Edinburgh Royal Infirmary. Abstract from Notes taken by E. F. Armour, M.B.).—*Adolescent Chorea; Chorea in each Pregnancy; Recovery Post-partum.*

February 26, 1890.—C. F., 29, married, was admitted into Ward 28, supposed to be three months pregnant, and suffering from choreic movements, which began in the face about New Year.

Family History.—Good.

Personal History.—No rheumatic fever, scarlet fever, or measles. No convulsions. She has always been easily frightened. During adolescence, while in domestic service, she had to leave her work with an illness that made her very restless. There is no other history of chorea before her marriage at 25.

History of her Pregnancies.—I. Miscarried at fifth month, wriggling of arms for two or three months previously. II. Premature labour at seventh month. Child still-born. Movements of face and arms for several months. III. Healthy child born at term (10th November 1888). She had wriggling movements the whole time, not nearly so severe as now. IV. Present illness. Pregnancy since December 1889. Movements in face about New Year; later, movements of arms.

February 9.—Had two teeth drawn.

February 19.—Movements general.

February 20.—Could not answer questions; confined to bed. Movements stop during sleep.

February 23.—Has to be fed.

February 26.—On admission, she was found well nourished, and affected with irregular involuntary movements in most of the muscles of face, head, trunk, and right arm; to a much less extent left arm and legs. Grasp impaired, mostly on left side. Speech impaired. Tongue bitten. Intelligence normal. Sensation normal. No ankle clonus or increased knee reflex. Respiration normal. Suspicion of pulmonary systolic bruit, and accentuation of second sound at base. Bowels regular. Urine normal. Uterus enlarged to size of two to three months' pregnancy; normal in position. Egg-flip every two hours. After Sulphonal, gr. 20, she slept for about four and a half hours altogether, and was quieter in the morning.

February 28.—Had rhythmic abdominal pains; movements became more violent. Light chloroform narcosis. Movements violent on waking. Paraldehyde ʒvj. and Potass. bromid. gr. 60. Sleep in twenty-two minutes. Slept altogether five and a half hours, and dozed at intervals afterwards. Tongue much bitten.

March 1.—Hypnotics in same doses. Sleep.

March 2.—Quieter. Sulphonal, gr. 20, not very effective; Paraldehyde, ʒiv.; Pot. brom., gr. 40.

March 3.—Movements less violent. At night restless. Paraldehyde, ʒvj.; Pot. brom., gr. 60, gave sleep.

March 4.—Movements: adduction of right arm, supination and pronation. Flexion and extension, supination and pronation of left forearm. Flexion of right knee and ankle. Rotation and nutation of head occasional. Mouth quiet. Occasional arching of back. The movements are worse when she knows she is observed. Liq. arsenicalis, ℥ʒ, every eight hours. At night violent. Paraldehyde, ʒvj., gave four hours' sleep. Restless.

March 5.—Movements worse; biting tongue. Pot. brom., gr. 60. Restless.

March 6.—Sulphonal, gr. 20. Carious molar extracted. Paraldehyde, ʒvj. Pot. brom., gr. 40.

March 7.—Had good night, and has very little movement.

March 8.—Carious roots extracted during chloroform narcosis.

March 14.—Patient has been very quiet.

March 16.—Ordered to walk in ward.

March 19.—Movements worse after death of a patient.

March 23.—Walked in the grounds to-day. Movements now present only when she laughs or is emotional or before strangers.

March 28.—Some bearing-down pains. Has movements in right hand, which stop during the spasms of pain.

April 3.—Discharged fairly well. She has complete control of

the movements, and can be quite still when requested. When inattentive she is constantly fiddling with her dress. Her laughing is somewhat exaggerated. She is to continue Liq. arsenicalis, ℥5 t. d.

April 16.—As on discharge.

(From a letter, May 1895, I am able to complete the history.—R. C. B.)

The patient was delivered of a still-born child at the seventh month. The movements then ceased.

She has since had another pregnancy, in which the movements recurred. She miscarried at the third month, and the movements again ceased. She says that she is still a little troubled with the movements.

CASE III.—(Edinburgh Royal Infirmary).[1]—*Adolescent Chorea; Chorea in each Pregnancy; Recovery ante-partum.*

April 19, 1893.—E. L., 24, married, was admitted to Ward 28 suffering from chorea of eight days' duration. Family history good. Patient had scarlet fever and whooping-cough in childhood. Menstruated at 16; twenty-eight days' type, lasting seven days, and very free. She has some leucorrhœa. At 17 she had a fright, being chased by a man; two months later she had chorea in left arm and leg, and was unable to resume work as a servant for a year. At 20, on becoming pregnant for the first time, she had chorea in both arms and legs, which lasted three months. Six weeks before term she fell and hurt her back and cut her eye. The child only lived a few seconds. In her second pregnancy she had movements of both arms and legs, but less severe than before. The movements usually cease when she feels life.

Present Illness.—About a month before the illness she had prinkling all over her when she was in bed. This occurred two or three times.

April 10.—She had jerking of hands, arms, legs, trunk, and head, which gradually got worse.

April 16.—Twice thrown out of bed. Has to be fed. The movements are quite involuntary. The tongue is shot out and in with a jerk. There is slight accentuation of the second sound. She is pregnant for the third time.

May 10.—Discharged recovered.

CASE IV.—(R. W. Felkin, M.D., Edinburgh).—*Pregnancy; Chorea dependent on Tender Hymen.*

July 11, 1889.—L. T., aged 19, from Devonshire, married seven months, came to me complaining of extreme nervousness, weakness, and a "queer" feeling in the left arm as far as the elbow, as

[1] This case was in Dr Affleck's Ward during the vacation, and I cannot say by whom the case was taken.—R. C. B.

well as of very severe headaches. Height, 5 ft. 4 in.; weight, 9 st. 4 lbs.

Present History.—Patient was quite well till shortly after marriage, when she began to get irritable; this has increased up till now. Weakness began a month ago; can do nothing at all. A week ago felt suddenly a very bad pain in her arm, dropped a cup she was holding, and has never kept still since. Her mother says she thinks patient is not all right, as she complains of great pain at attempted coitus, which is very frequent. Patient is about five months pregnant.

Past History.—Was always nervous; clever at school; suffered from headaches and from wetting bed, caused, mother says, from teacher keeping her in too long.

Family History.—Mother and father healthy, but mother has a nervous temperament. She has had four girls and one boy. Three died young from bronchitis.

Present State.—Patient is very nervous, and can hardly answer questions; face flushed; eyes have a wild look. Pulse, 120; temperature, 98°·6; respirations, 22. Characteristic choreic movements of hands, arms, face, and slightly also in legs. Soft blowing murmurs heard at apex and base of heart. Breasts very large, tense, and painful to touch. Urine pale, s.g. 1020, slightly acid, slight deposit of mucus, no albumen or sugar. No other examination at the time possible. Ordered arsenic and bromides.

August 2.—Has been getting worse; complains herself now of her husband's frequent attempts and the pain they cause. On inspection, labia red and swollen; hymen circular, congested, has not been ruptured. It was very tough, and with some difficulty snipped in four places. The mother was instructed how to dress it.

August 10.—Patient returned quite well; has no trouble now in any way.

Note by Dr Felkin.—There can, I think, be no doubt as to the cause of the chorea in this case. I have seen, I think, two other cases of a very similar nature, and one in a woman who had had two children. She had been well during her previous pregnancies, but the chorea was well marked in the third. It was due to a polypus growing from the urethra; coitus gave her great pain; after its removal all went well.

CASE V.—(G. Cardno Still, M.B., Shepshed, Leicestershire).—*Second Pregnancy; Chorea; Recovery post-partum.*

A. M., 26, married six years; had no previous chorea, rheumatism, or scarlet fever. She has had one previous pregnancy, which was normal. Family history good. Mother had "fits," probably hysteric, at menopause.

July 25, 1894.—About two weeks after quickening in the fifth month of her second pregnancy she was attacked with severe

chorea involving all the voluntary muscles,—eyes, mouth, tongue, face, arms, legs, and trunk. She was unable to do any work for six months, and had to be fed and dressed. For two months she could scarcely take nourishment. She slept fairly well as a rule, but till a fortnight before delivery the movements persisted during sleep. Urine scanty, but free from albumen. Breathing hurried and irregular; no dyspnœa. Loud systolic mitral bruit. (This has since disappeared, April 12, 1895.) She was treated with arsenic, bromide of potassium, and chloral hydrate. The last two in combination seemed to have most effect. She improved slightly before labour, which took place on 25th November. Labour lasted three hours, was normal, and had no effect whatever on the choreic movements. The child was normal, was nursed by its mother, and has remained well. The chorea continued nearly three months post-partum, and she still frowns occasionally. The fingers do not twitch.

CASE VI.—(T. W. Thursfield, M.D., Leamington).—*Pregnancy; Severe Chorea; Induced Abortion; Death.*

July 14, 1894.—A. C., æt. 20, housewife, was admitted into the Warneford Hospital, under Dr Thursfield, suffering from severe chorea of three weeks' duration. She had been married three years, and had had two previous pregnancies. On the last occasion she aborted at the sixth month, and had a severe attack of chorea, which lasted for six weeks. No history of chorea or rheumatic fever when a child; no other member of the family choreic.

On admission, the patient was suffering from a severe attack of chorea. The movements were general and well marked. There was great difficulty in feeding the patient and keeping her from falling out of bed. Speech was interjectional, and the first sound of the heart was loud and blowing. The uterine enlargement indicated a fifth month pregnancy; the cervix uteri was soft; the os closed. The urine contained a heavy cloud of albumen; lungs were natural and temperature normal. Pulse was 110 and regular, but very feeble.

July 15.—Movements became more severe, and vomiting commenced. It was decided to procure premature labour. At 8 P.M. the cervix was dilated by the finger, and the membranes ruptured.

July 16 (6.30 A.M.).—Patient was delivered of a fifth month fœtus (dead), together with placenta and membranes. For the remainder of the day the choreic movements were much less marked, and the vomiting ceased.

July 17.—Very restless during night; slept about couple of hours after injection of morphia (℥ iij.) at 1.30 and 4 A.M. Several hours' sleep followed a subcutaneous injection of hyoscine (gr. $\frac{1}{100}$) at 11.30 A.M. Took food well in the intervals.

July 18 (2 A.M.).—Inj. hyoscin. (gr. $\frac{1}{200}$), followed by couple of hours' sleep. Was still taking food well, and much quieter.

July 19.—Slept three hours during the night without any hyoscine. Marked improvement.

July 20.—Chloral hydrate, grs. 10, was ordered three times a day. Slept well during the night without any additional narcotic. Bowels acted five times slightly after glycerine enema (3j.). Temperature rose to 101°·4 F.

July 21, 22, *and* 23.—Diarrhœa abated after the administration of several doses of bismuth and morphia.

July 24.—Diarrhœa became very troublesome; bowels were open seven times during the night. Temperature was normal. The motions were fœtid; there were no spots on abdomen.

July 25.—Slight improvement was manifested.

July 26.—Diarrhœa ceased after repeated doses of chalk and opium. Temperature rose to 104°.

July 27.—As soon as the diarrhœa ceased the vomiting and choreic movements recommenced; the patient became rapidly worse, and sank towards the end of the day.

Post-mortem not allowed by patient's friends.

In the appended Tables I have arranged the recorded cases in the following classes:—

A. Pregnancy occurring in the course of pre-existent chorea.
B. (1.) Chorea arising during pregnancy—recovery ante-partum.
(2.) Chorea arising during pregnancy—recovery post-partum.
(3.) Chorea arising in recurrent pregnancies.
(4.) Chorea arising in fatal cases.
(5.) Cases where exact classifying information is absent.
C. Chorea arising post-partum.
D. Cases of alleged chorea gravidarum which I have excluded.

Omitting the last class, I have had for analysis the records of 285 cases of chorea in relation to pregnancy occurring in 226 individuals,—a mass of material nearly twice as great as has hitherto been dealt with. I have no doubt that a careful search in the reports of large hospitals would extend the list much further, but these are not at my command, and the results of my analysis are sufficiently interesting to justify their communication.

Chorea was present at the onset of pregnancy in 6 cases, and the variety of its behaviour in relation to the gestation is both curious and interesting. In Schwechten's case (6 [1]) a chorea of seventeen years' duration ceased suddenly at the outset of pregnancy, and in Richardson's (5) suddenly after labour. Marcé's case continued unchanged, and in the others the chorea after being exaggerated during the pregnancy recovered after delivery.

Family History.—(*a.*) Five patients had a choreic sister; the attack in (60) occurring at the end of a first pregnancy, and once the father had chorea as well as a sister. In 2 cases the mother

[1] A number given thus refers to my Table, where the details will be found.

had had chorea in [illegible] while pregnant with the patient. (*b.*) Four had epileptic relatives, and two more relatives said to have "fits." In addition one had a mother who always had eclampsia during labour, and the mother of another had hysterical fits at the menopause.

Chorea of Twin.—The child in 119 had chorea at 12 years, in 121 at [illegible], and 144 also gave birth to a child which is said to be choreic, though the time of onset is not given. (103) should be again noted here.

Personal History.—(*a*) *Chorea* is stated to have occurred previously in 66 cases, 42 being primiparæ, while it is explicitly negatived in 53. (*b*) *Hysteria* is noted in 14 cases; in (216) a post-partum left cranial neuralgia gave place to chorea, and this in turn to hysteric crises. 124 a previous chorea had recurred daily at the hour of a fright of (12[illegible]). The other cases are (11, 24, 37, 46, 47, 54, 63, 67, 68, 85, 94, 214), and of these a detailed study scarcely justifies Bouchet's conclusion that hysteria and chorea are but two forms of the same disease. (*c*) *Shock*, fright, or violent emotional disturbance immediately or at a short interval preceded the chorea in 23 cases. (*d*) *Rheumatism* (usually acute): 25 patients had rheumatism previously, in 4 cases (65, 88, 112, 129) associated with chorea, (233) had rheumatism repeatedly, and (92) repeated attacks of rheumatism with chorea. Fifteen patients had rheumatism shortly before or during the chorea, and in (201) chorea terminated in rheumatism; (225) had a later attack of rheumatism with chorea. In (142) there is a history of previous chorea after chill, and chill occurred at the onset in cases (20, 22, 94). Thus in 45 cases we have a rheumatic personal history. (*e*.) *Infective processes* preceded chorea during the puerperium in (216, 217, 224), and occurred also in (87, 141, 142, 143, 150, 153, 157, 160, 167, 170, 184) during the chorea; but while this may explain the occurrence of a number of fatal terminations, it scarcely gives clear ground for a class of cases of chorea due to infective causes. In 5 other cases (89, 134, 136, 144, 168) a certain amount of feverishness occurred. (*f*.) *Insanity* previously is recorded in (24). In 8 other cases insanity followed the chorea, recovery taking place usually in a few weeks or months. In (20) the chorea disappeared as the insanity developed, an alternation of neuroses exhibited also in (217) and in (67).

Age.—The patients are distributed according to age as follows:—

Age, . .	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	33	35	36	39	40	
First Choreic Pregnancy, .	1	..	9	16	22	33	13	12	30	17	8	7	4	4	..	2	2	1	1	1	2	=185
Fatal, . .	..	..	3	3	3	5	3	..	5	3	3	1	1	1	..	2	..	..	1	..	..	
						14/80				14/80						5/17						

The irregularities in the series seem to show that we have still not a large enough collection of cases, but it is also evident that the occurrence of chorea in pregnancy is increasingly less common every year after 24.

The number of the pregnancy of first attack was—

	I.	II.	III.	IV.	V.	VI.	
	127	48	19	14	4	2	times.
Fatal, .	13	8	1	3	...	...	„

While there were recurrences in 19 II., 3 III., 5 IV. pregnancies. Thus 59 per cent. were attacked in their first pregnancy.

Condition.—It has been repeatedly suggested that illegitimacy is one of the exciting causes of chorea, but this does not seem to be borne out by the cases. There are 14 single primiparæ in 77 cases, *i.e.*, 18 per cent., a proportion which does not exceed that of illegitimate primiparæ in general.

Onset of Chorea.—The periods of pregnancy were—

1st month, 29 times.	6th month, 19 times.
2nd „ 30 „	7th „ 13 „
3rd „ 42 „	8th „ 5 „
4th „ 22 „	9th „ 7 „
5th „ 25 „	Post-partum, 16 „

So that including 7 cases arising in the early months and 4 in the middle, we have beginning in the first three months 108 cases; second three months, 70 cases; last three months, 25 cases.

Termination of Pregnancy.—The periods given are—

3rd month, 5 times.	7th month, 8 times.
4th „ 4 „	8th „ 7 „
5th „ 6 „	9th, or term, 106 „
6th „ 8 „	

Seven patients were said to abort, and 9 deliveries are called premature. Thus, of cases where the pregnancy terminated spontaneously, two-thirds were delivered in the ninth month.

Thirteen patients died undelivered, and in 20 cases labour was induced, but in (36) this was done on account of persistent apathy, the chorea having previously stopped.

The *distribution of the choreic movements* varied considerably. In table B. (1)–(4) they were mainly or entirely right-sided 14 times, mainly or entirely left-sided 12 times, general 83 times, confined to the legs 5 times, in case (114) to one foot, in (117) to the left arm and right leg, while in case (83) the left leg alone was free from movements.

The *severity of the movements* also varied greatly, as may be seen from the following table:—

	Recovering Ante-partum.	Recovering Post-partum.	Recurrents.	Fatal.
Slight, .	2	3	1	...
Moderate, .	7	6	4	...
Severe, .	5	18	14	13
Violent, .	4	10	2	13

From the table is derivable a result that we might have expected, viz., that the less severe the chorea the more likely is its recovery ante-partum. Thus slight or moderate cases constitute half the first column, but only a quarter of the second, while the fatal cases are all either severe or violent. In several instances the movements persisted during sleep even when due to narcotics (139), (156).

The *effect of delivery* on the choreic movements was extremely varied. The records of the labours are unfortunately not always clear, so that we are at a loss to determine the exact import of the phrase, "movements worse during the pains." In my own case the movements were almost stopped during each pain, every muscle being strained for the expulsive effort; but they broke loose, greatly increased on cessation of the pain. In most of the uncomplicated cases the chorea gradually improved after delivery, even without treatment. In (5) it was sudden after labour; in (76) sudden on removal of the placenta; in (105) hyperemesis stopped, and the chorea became limited to one side on induction of labour, and recovery took place on the day of delivery. In (140) the chorea terminated in an attack of eclampsia a few minutes after delivery. Cases (81, 99, 142, 144) also made rapid, almost sudden recovery.

It is useful to notice here cases (14, 61, 72, 120), which were made worse by obstetrical examination; and to contrast a case mentioned by Leopold in the discussion on Fehling's case (61), in which the movements stopped during internal examination.

In (55) and (64) the movements were exaggerated at the recurrence of the menstrual periods; in (152) (177) after each repetition of venesection.

In (196) the attack was exaggerated daily about 7 P.M.; but as in the interval there was constant "tremor," the disease may not have been true chorea, even though similar exaggerations are noted in (124).

Effect of *fœtal movements and death.* In (14) and (120) the movements are said to have been exaggerated when the mother noticed the fœtal movements, but this was not so in other cases. In 11 cases it is recorded that the child was born dead, but no attention

has been paid to the time of its death, or its effect on the chorea. In cases (142, 146, 147, 160, 165, 166, 177) the mother died, and in (87, 89, 91) only recovered post-partum, so that in these cases the death of the fœtus seems to have had little or no effect on the chorea. In case (21) the chorea stopped before delivery, but the data are not sufficient to show whether the death of the fœtus had anything to do with this result.

Achoreic pregnancies preceded the choreic in 31 patients, the number of such pregnancies being over 52 (one is described as multipara). Of these patients, 5 only are recorded to have had previous chorea. In (143) the first pregnancy was choreic, the second free, the third choreic and fatal. Nine patients are recorded to have had subsequent pregnancies free from chorea. Of these, two had already had more than one attack during pregnancy.

Recurrents.—The cases in our list of recurrent chorea in pregnancy number 31, the number of recorded attacks varying from two to five. Of these cases, 5 were ultimately fatal, and are discussed along with the other fatal cases.

Maternal Mortality.—From the tables of age and of number of pregnancy already given we might conclude that the fatality increased with age and with the number of the pregnancy, but the numbers are so small that no great stress should be laid on these results.

In 255 pregnancies 45 were fatal, a mortality of less than 1 in 5, and even this must be considerably in excess of the actual mortality, inasmuch as so large a number of the milder cases are not reported. Thus, for example, Pinard had 8 cases, all recovering, in only 3 of which I could find detailed reports (*Thèse Riche*). Friis 8 cases, 1 fatal; E. Martin 2 cases (*Berlin. klin. Woch.*, 1875, xii. p. 242); Leopold 4 (*Centralb. f. Gyn.*, 1889, p. 573); and Steinkopff 1 (*Dissertation*, 1890), all recovering; and in 11 other cases in my tables no fatal result is suggested, although the issue of the chorea is not stated.

The prognosis, however, is even better than this, for recovery is stated to have occurred before the termination of the pregnancy in 63 cases; and, as we shall see from a detailed study of the fatal cases, death was not always due to the chorea, but to some grave complication of the pregnancy or puerperium, such as albuminuria, eclampsia, or septicæmia. In (185) the chorea had recovered, but fright, due to the fall of a bracket with bottles, caused recurrence, from which she died in two days.

Fatal Cases.—(*a.*) Fourteen cases died undelivered. The following seem to need special notice:—In (155) the account suggests morphia poisoning. At 2 P.M. a hypodermic injection of 1 grain of morphia produced wildness, with short naps; 6 P.M., cessation of pulse movements, with imperfect respiration; pulse 160 per minute, small; consciousness absent. Death at midnight, three days after onset of chorea.

(173) tuberculosis of kidney and bladder, with albuminuria; abnormality of central nervous system slight.

(168) œdema of lungs at end, and autopsy showed thick dark clot under the dura mater on right side, and effusion in cerebellar fossa.

In (151, 154, 167, 170, 178) the post-mortem notes, so far as they go, suggest infective processes, as perhaps does (162).

In (156) and (159) delivery was incomplete; and the former again suggests an infective process, there being pulmonary congestion and microscopic capillary embolisms in the kidney.

In 4 cases there is no information as to the termination of the pregnancy, and in (175) intestinal ulceration was found post-mortem.

(*b.*) Sixteen cases died after spontaneous delivery, (165) had severe bronchitis, with dyspnœa and œdema, (146) puerperal eclampsia, (163) death from post-partum hæmorrhage, and the autopsy showed infective processes. (141, 143, 153, 157) were infective, showing diphtheritic endometritis and other signs of sepsis; (157) was further complicated with complete placenta prævia. (150) was also apparently infective, there being broncho-pneumonia, with high temperature before the miscarriage; and this patient had struma. (160) had also lobular pneumonia and albuminuria, and the post-mortem showed pachymeningitis and meningitis of the spinal cord; while in (161) there was dorsal meningitis and softening of the cord.

Thus in at least eight cases the death was apparently due to causes apart from chorea altogether, and thirteen or fourteen probably suffered from infective processes of which the choreic movements may have been only symptomatic. Other fatal cases are dealt with in the next paragraph.

Induced Delivery took place in 20 cases; of these, 8 died, but in several the complications were so grave that the result can scarcely be attributed to the chorea. Thus (144) had glycosuria, and died of hæmorrhage on the velum interpositum. In this case Mr Tait kept the patient under chloroform for three hours post-partum, and the movements remained absent for ten hours more, and he says—"Should I ever meet with a similar condition again, I shall keep the patient under (chloroform) for six months rather than have a like result." Fortunately (92) this was unnecessary.

(145) had albuminuria, with fever and diarrhœa, (147) fever at end.

(172) albuminuria, (184) puerperal septicæmia.

(142) died with œdema of brain and deglutition pneumonia, chloroform narcosis having been maintained for twenty-four hours after delivery.

In case (171) labour had been induced, but was not completed; and there were found œdema of lungs, fatty infiltration of liver and heart, parenchymatous nephritis.

In 11 cases recovery took place after induced delivery; (92) delivery did not affect chorea, which improved under chloral; (80) recovered after a sacral abscess; (87) after puerperal septicæmia; in (105) hyperemesis ceased while the abortion was in progress, the chorea being simultaneously reduced to the left side; (130) albuminuria and delirium; (89) and (101) delirium; (91) hallucinations; (96) opisthotonos. In (36) delivery was induced on account of persistent apathy after the chorea stopped.

Four more cases should be mentioned here. (200) which improved as soon as the bougie was introduced; (32) recovery on successful dilatation of the cervix; (83) great improvement on dilatation of cervix; (13) recovery after incision of tender hymen; but in this case the chorea was probably dependent less on the pregnancy than on the dyspareunia, or may be compared with a non-pregnant case where chorea was always stopped by rectifying a retroflexion of the uterus (Beigel, *Krankh. d. Weibl. Geschl.*, 1875, ii. p. 228).

Though the issue in cases of the induction of premature labour or abortion is not always satisfactory, it should be borne in mind that the condition of the patient was, as a rule, one of immediate peril, and that obstetrical interference was demanded on the chance of betterment. In some cases (105) the result of treatment is absolutely brilliant, though at others the management may suggest panic on the part of the physician.

Child Mortality.—Fourteen patients died undelivered; 23 were delivered before the end of the sixth month; 14 children were still-born, 12 were small or weakly, 58 are described as alive or well; but this number must be much too small, as in so many reports no entry is made.

Convulsions.—Six children had convulsions, at 2 and 3 days (two), 3 and 7 weeks, and 2½ years old respectively.

Puerperal Chorea.—Of the sixteen cases placed in this table, four which occurred from two to five months after delivery may be set aside as not truly puerperal (20, 128, 222, 226). Case (218), published in 1661, seems to be the earliest recorded case of chorea in relation to gestation, although there are earlier references to such a connexion. In this case the description is so perfect that I think it merits reproduction here. "Peculiare autem hoc esse existimo quod Ludimoderatoris cujusdam uxori in puerperio accidit. Ab eo enim nescio quam ob causam, jam ultra duodecim vel plures annos totum latus sinistrum vigilanti continuo movetur praeter voluntatem, ita ut oculos perpetuo nictitet, labia assidue diducantur et clauduntur, brachium subsultet, digiti gesticulentur et pes nunquam consistet; omnia tamen sine sensu et dolore; dormienti vero omnia quiescunt."

In another case, recorded by Romberg, the chorea had also become chronic, and was also unilateral, but on the right side. Of the remaining ten cases (216, 217, 220, 223, 224) were associated

with acute, probably infective, illness in the puerperium, and of these 2 were fatal. Marcé's patient (220) had some painful emotion at the first onset of menstruation, and had chorea for two months afterwards.

Excluded Cases.—The following six cases occurring in lists hitherto published I have excluded—(1.) Mayo (Reid), *Lond. Med. Gaz.*, 1835, xv. p. 287, a multipara, after fright at the fourth month of pregnancy, suffered for two months from "extreme nervous illness," but there is no mention of chorea except in the child, which was born at term. (2.) Ingleby's third case, where chorea (fatal) came on immediately after marriage, and pregnancy was the "presumed" cause. (3.) Ingleby's second case, a primipara attacked by spasms at the fourth month:—"The muscles of the right side of the neck and right upper extremity were severely affected. At one time they were in a state of rigidity, at another the head was drawn to one side and the chin to the shoulder. The attacks occurred almost daily, and usually lasted about twenty minutes," — a description more like spasmodic torticollis than chorea. (4.) Hecker, *Monats. f. Geburtsk.*, 1856, viii. 417, also *Virchow's Arch.* (Mosler), 1862, xxv. p. 607. A woman of 32, who at her fourth confinement had had retained placenta, and five days later *chorée rotatoire* limited to the head and recurring about sixteen times a day, in the eighth month of her fifth pregnancy had "pendulum movements" of head, arms, and trunk above the umbilicus successively in attacks of a half to one minute's duration. They were only restrained with great difficulty, were severe, and became progressively more and more rapid. During the attack the face was pale, eyes turned in and up, pupils moderately dilated, and the pulse quickened, so that the case is evidently not one of ordinary chorea. (5.) Stephann, *Centralb. f. Gyn.*, 1885. A spoiled child in the ninth month of her first pregnancy, after a faint had paralysis of the left arm. This was better next day and the right arm paralysed, and she had ptosis and twitching of the face. When she spoke she had movements in the paralysed right arm. (6.) Ogle (Day), *Brit. and For. Med. Chir. Rev.*, 1868, xli. p. 507. The attacks were occasional, and there was spinal tenderness. Spinal meningitis was found at the autopsy. Case (161) should, perhaps, have been placed here.

General Prognostic Results of Enquiry.—In 214 patients we had 273 attacks of chorea associated with pregnancy. The mortality was less than 1 in 5, even when cases with grave complications are included. If these be omitted, it is about 1 in 7 of the recorded cases. In 7 cases, 2 of these arising during the puerperium, the chorea became chronic, (82) recovering three years later under treatment. Sixty cases recovered before delivery, 90 cases recovered post-partum, and in the other cases the period of recovery is not stated. The insanity which was supposed to be a common result is not frequent, and is usually temporary. If the patient

recover from the chorea there is a distinct chance that she may escape it entirely in subsequent pregnancies.

Into a discussion of the treatment or the general pathology of chorea I have not thought it needful to enter, inasmuch as the case records do not throw much light upon the questions at issue; nor do they often show in any clear manner the nature of the influence which pregnancy exerts on the chorea. In some it is clearly a mere reflex neurosis (13), in others largely of hysterical nature, while the now trite observation that "the fidgets" of pregnant women is a slight chorea suggests an explanation that fits a large proportion of the cases, viz.,—that pregnancy increases the condition of nervous instability and renders the common causes of choreic movements more effective.

Note.—On the influence of pregnancy in the development of hereditary (Huntington's) chorea I have not material enough to form a basis for discussion.

Chronological List of the Published Cases and Early Literature of Chorea Gravidarum.

1609 SCHENKIUS. *Observ. Med. Rar.*, p. 128, De Spasmo.
1661 HORSTIUS, GREG. *Op. Med.*, 2, p. 437 (Eisenmenger).
1696 RIEDLIN. *Lineæ Med.*
1764 UNGEN. *Journ. de Méd. d. Parm.*; also *Gaz. Salut.*
1787 BURSIERIUS. *Inst. Med. Pract.*, vol. 3.
1796 DREYSSIG. *Hdbk. d. Chron. Krankheiten.*, Bd. 1.
1807 HAND. *Hufeland's Journ.*, 26, Heft 3, p. 81.
1812 SCHNEIDER. *Hdbk. Krkh. d. Kind.*, Bd. 4.
1817 CAPURON. *Tr. Mal. d. femmes*, p. 458.
1820 VOGEL. *Hufeland's Journ.*, 51, Heft 4, p. 85.
1821 FRANK. *Prax. Med. Univ.*
1824 PRICHARD. *London Med. Repository.* N. S., 1, p. 3.
1825 JEFFREYS. *Edinb. Med. and Surg. Journ.*, 5, p. 273.
1835 MAYO (REID). *London Med. Gaz.*, 15, p. 287.
1838 TURNER. *London Med. Gaz.*, 21, p. 532.
1839 BEZOLD. *Holscher's Annalen.*
1840 INGLEBY. *Lancet*, 1, p. 782.
1844 WICKE. *Veitstanz u. Unwillk. Muskelbeweg.*, p. 316.
1846 BEER. Dissert., Berlin (one of Romberg's cases).
TROUSSEAU. *Bull. gén. d. Thérap.*, 31, p. 213.
1847 LEVER. *Guy's Hosp. Rep.*, 2 S., 5, p. 3.
1848 LEVER. *Guy's Hosp. Rep.*, 2 S., 6, p. 233.
HELFFT. *Hamburg. Zeits.*
LEE. *Clinical Midwifery*, 2nd ed., p. 112 (1st ed., p. 99 1842).
LABORIE (DUBOIS). *Union méd.*
1850 SÉE. *Mém. Acad. de méd.*, 15, p. 443.
1851 ARAN. *Union méd.*

1888 HIRST. *University Med. Mag.* (Philad.), 1, p. 151.
DODGE. *Med. News* (Philad.), vol. 2.
HOCQUET. Paris Thèse (Chorée et Hystérie).
TAIT. *Med. Press*, 1, p. 457.
1889 JONES. *Obstet. Trans.*, 31, p. 247.
BENNINGTON. *Northumberland and Durh. Med. Soc. Trans.*
CHARPENTIER. *Tr. d. Accouch.*, 2nd ed., 1, p. 873.
HUET. Paris Thèse (Chorée chronique).
RUHEMANN. Dissert., Berlin.
LLOYD. *Amer. Syst. Obstetrics* (Hirst), 2, p. 579.
1890 GROFF. *Coll. and Chir. Rec.* (Philad.), vol. 11.
PANTZER. *Centralbl. f. Gyn.*, p. 572.
STEINKOPFF. Dissert., Halle (Chor. d. Erwachsenen).
1891 M'CANN. *Obstet. Trans.*, 33, p. 416.
HICKS. *Obstet. Trans.* 33, p. 486.
RICHE. Paris Thèse.
1892 FRIIS. *Hosp. Tidende*, 3rd R., 10, p. 661 (Om Chorea hos Voksne).
TURNER. *Pathol. Trans.*, 43, p. 8.
DIDIER. *Journ. de Sc. Méd.*, Lille.
MARX. *Amer. Journ. Obstet.*, 25, p. 648.
CAMERON. *Montreal Med. Journ.*, vol. 20.
LLOYD. *Internat. Med. Mag.* (Philad.), 1, p. 593.
WALLS. *Chicago Med. Recorder*, vol. 3.
1893 FONTENAU. Paris Thèse.
BRETON. Paris Thèse (Etat mental dans la Chorée).
PERRET. *Prov. Med.*
PUECH. *Arch. d. Tocol.*, p. 275; also, 1892, *Montpell. Med.*
1894 OSLER. *Chorea*, p. 41.
VINAY. *Mal. d. l. Grossesse*, p. 584.
LANTOS. *Festschrift Ges. f. Geb. u. Gyn.*, Berlin S. A.
BEULQUE. Lille Thèse (*v.* Bué, 1895).
EBERSON. *Nederl. Tijds. v. Verlosk* (Haarlem), p. 215.
DAVIS. *Med. News* (Philad.), 64, p. 431.
1895 BUÉ. *Arch. d. Tocol.*, 21, p. 47.

This list includes all the original references I have collected. Where they have been inaccessible to me I have not quoted a page. The original sources of the cases of Hufeland and Furnes, quoted by Barnes, of Fieber in Schwechten's table, of Hallopeau in Charpentier's table, and of Kaulish, Leopold, Leudet, and Rombault quoted by Vinay, I have not been able to discover. There is a reference for Kaulish to *Prager Med. Woch.*, 1885, but his case is referred to in Herve's Thèse, 1884. The two cases of Dickinson quoted by Vinay I take to be those in the *Medico-Chir. Trans.* for 1886, which were originally published by Ogle, and of Pinard's 8 cases (Vinay), three surely are those published in Riche's Thèse.

1876 DICKINSON. *Med. Chir. Trans.*, 59, p. 1 (Table includes Ogle's cases).
1877 LYMAN. *Boston Med. and Surg. Journ.*
RICHARDSON. *Boston Med. and Surg. Journ.*
HAZARD. *St Louis Clin. Rec.*, vol. 4.
1878 EDGERLEY. *Boston Med. and Surg. Journ.*
SWIFT. *Boston Med. and Surg. Journ.*
M'LANE HAMILTON. *Nervous Diseases*, p. 398.
1880 EDGE. *Brit. Med. Journ.*, 1, p. 516.
SAWYER. *Lancet*, 2, p. 177.
WADE. *Obstet. Trans.*, 22, p. 244.
WADE. *Lancet*, 2, p. 854.
1881 BASTIAN. *Brit. Med. Journ.*, 1, p. 683.
MACKENZIE. *Internat. Med. Cong.*, 4, p. 99.
GRÖSCHNER. Dissert., Greifswald.
STURGES. *Chorea*, p. 167.
AHLFELD. *Arch. f. Gynæk.*, 18, p. 314.
1882 MUNDÉ. *Amer. Journ. Obstet.*, 15, p. 187.
1883 BENICKE. *Zeits. f. Gynæk.*, 9, p. 215 (Kunstl. Abort.).
PEREGO. *Riv. Ital. d. terap.* (Piacenza), vol. 3.
CHARPENTIER. *Tr. d. Accouch.*, 1st ed.
1884 HERVÉ. Paris Thèse.
GAYRARD. Paris Thèse.
VASSITCH. Paris Thèse (Chorée des Adultes).
OLSHAUSEN. *Klin. Beiträge*, p. 169.
BROUARDEL. *Annales d. Gynéc.*, 22, p. 293; also *Paris Méd.*, vol. 9.
1885 STEPHANN. *Centralbl. f. Gyn.*, p.
MILES. *Columbus Med. Journ.*, vol. 3.
1886 CHURTON. *Provincial Med. Journ.*, vol. 5.
SCHUHL. *Arch. d. Tocol.*, p. 690.
CHARLES. *Journ. d. Accouch. Liège.*
POLLOCK. *Lancet*, 1, p. 686.
LITTEN. *Charité Annalen*, 11, p. 265 (Ætiol. d. Chorea).
1887 Collect. Invest. Report (Mackenzie), *Brit. Med. Journ.*, 1, p. 425.
KEMPER. *Med. Record* (*N. Y.*), 31, p. 608.
TALENT. *Edinb. Obstet. Trans.*, 12, p. 202; (also M'Cann, *Obstet. T.*, 33.
WASSEIGE. *Bull. Ac. roy. de méd. de Belg.*, 4 S., 1, p. 384.
KOCH. *Arch. f. Klin. Med.*, 40, p. 514.
LEHMANN. Dissert. Berl. (Chorea u. Psychosen).
REDTENBACHER. *Ber. Rudolphstift*, Wien (1886), p. 326.
VOLQAUARDSEN. *New Yorker Med. Presse*, vol. 4.
1888 WALKER and SHERMAN. *Med. World* (*N. Y.*).
MARSHALL and HELME. *Med. and Surg. Reporter* (Philad.) vol. 54.
BENEDICT. *Med. Press* (*West N. Y.*)

1888 HIRST. *University Med. Mag.* (Philad.), 1, p. 151.
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1895 BUÉ. *Arch. d. Tocol.*, 21, p. 47.

This list includes all the original references I have collected. Where they have been inaccessible to me I have not quoted a page. The original sources of the cases of Hufeland and Furnes, quoted by Barnes, of Fieber in Schwechten's table, of Hallopeau in Charpentier's table, and of Kaulish, Leopold, Leudet, and Rombault quoted by Vinay, I have not been able to discover. There is a reference for Kaulish to *Prager Med. Woch.*, 1885, but his case is referred to in Herve's Thèse, 1884. The two cases of Dickinson quoted by Vinay I take to be those in the *Medico-Chir. Trans.* for 1886, which were originally published by Ogle, and of Pinard's 8 cases (Vinay), three surely are those published in Riche's Thèse.

205	Friis.	1892	*Hosp. Tidende*, 3d. R. 10, p. 681.	E. A.	27	M.	.....
206	Hallopeau.	...	*Charpentier's Table Tr. d. Accouch.*, 2nd ed., 1, p. 875.	...	18	...	.....
207	Litten.	1886	*Charité Annalen*, 11, p. 297.	(1)	...	...	.....
208	Litten.	1886	*Charité Annalen*, 11, p. 297.	(2)	23	M.	.....
209	Litten.	1886	*Charité Annalen*, 11, p. 297.	(6)	22	M.	.....
210	Litten.	1886	*Charité Annalen*, 11, p. 297.	(7)	24	S.	.....
211	Lloyd.	1889	*Amer. Syst. Obst.*, 2, p. 595.	...	...	M.	.....
212	Lyman.	1877	* *Boston Med. Surg. J.*	J.	30	...	.....
213	Lyman.	1877	*Boston Med. Surg. J.*	...	18	...	.....
214	Schwarze.	1892	*Charité Annalen*, 17, p. 486.	D.	20	...	.....
215	Vassitch.	1888	Paris Thèse, p. 94.	E. V.	22	S.	.....
216	Charpentier.	1889	*Tr. des Accouch.*, 2nd ed., 1, p. 877.	...	30	M.	.....
128	Coll. Inv. Comm. (Pearse).	1887	*Brit. Med. J.*, 1, p. 427.	...	...	M.	.....
217	Dettling, in Duchateau.	1892	* Lyon Thèse.	...	23	...	.....
117	Fontenau (Rendu).	1893	Paris Thèse, p. 71.	J. V.	18	...	.....
218	Horstius Greg. (Eisenmenger).	1661	Paris Thèse.	Obs. XV.	...	...	.....
20	Lehmann (Westphal).	1887	*Op. Med.*, 2. p. 487.	C. H.	22	S.	.....
134	Lever.	1847	Diss., Berl, p. 34.	A. E.	...	M.	.....
219	Löhlein.	1875	*Guy's Rep.*, 2nd S., 5	...	40	...	F. chorea; S. ch
220	Marcé.	1860	*Berl. klin. Woch.*, 12, p. 242.	...	23	...	.....
221	Romberg.	1846	*Mém. Ac. Méd.*, 24, p. 30.	...	40	...	.....
222	Vassitch.	1883	*Klin. Ergebnisse*, p. 20.	J. D.	19	M.	.....
223	Gayrard (Gouraud).	1884	Paris Thèse, p. 95.	A. O.	21	M.	.....
224	Litten.	1886	Paris Thèse, p. 36.	...	...	...	.....
225	Ogle.	1868	*Charité Annalen*, 11, p. 279.	M. H.	22	M.	.....
99	Spiegelberg.	1858	*Brit. and For. Med.-Chir. R.*, 41, p. 211.	...	28	M.	.....
226	Trousseau.	1868	*Monats. f. Geburtsk.*, 11, p. 115.	...	24	M.	.....

.....	R.	...	ATIONS.
	RESULT OF CHOREA.	CHILD.	

Complication.	Child.	Result of Chorea.	
vere bronchitis; œdema; dyspnœa.	Dead.	D.	1 day p.p. Brain congested; cord softened.
.....	Dead.	D.	Asthenia 2 days p.p.
) sleep for a week.	Undelivered.	D.	Coma; mitral vegetations; nephritis; peritoneal injection.
100°·4; rose ante-mortem to 107°. Œdema of lungs.	Undelivered.	D.	16 days from onset. Longitudinal sinus, blood semi-coagulated; thick clot under dura of R. side; effusion in cerebellar fossa; mitral vegetations.
.....	Living.	D.	4 days p.p., exhaustion. Mitral vegetations; old thickening; brain congested.
yperemesis; tenderness 7th–12th dorsal spines.	Undelivered.	D.	Coma. Mitral vegetations; infarcts in R. kidney.
.....	Undelivered.	D.	Collapse. Heart fatty; lungs, atelectasis and œdema; parenchymatous nephritis.
idema eyelids and feet; urine very albuminous; T. slight rise.	Abort.	D.	Syncope 20 hours p.p.
. albuminuria; temporary paresis of R. side; first sound blowing.	Undelivered.	D.	Collapse 5 mo. Tubercle of kidney and bladder.
.....	Undelivered.	D.	.....
.....	Undelivered.	D.	Intestinal ulceration.
.....	...	D.	No abnormality found, save turgidity of the brain.
.....	Dead.	D.	Exhaustion, 6 days. Softening of corpus callosum.
.....	Undelivered.	D.	Extensive softening of white matter, with hæmorrhage in region of 9th dorsal nerves; recent mitral endometritis.
o murmur.	..	D.	Mitral vegetations.
.....	...	D.	Puerperal eclampsia.
.....	...	D.	.....
aniacal.	. .	D.	Brain congested, especially choroid plexuses.
.....	...	D.	Mitral and aortic vegetations.
. albuminuria; systolic murmur.	...	D.	Puerperal septicæmia. Degeneration of cells in Rolandic area; pyæmia; pneumonia; spleen infarcts.
.....	...	D.	two days after fright.
.....	...	4 R.	.....
.....	...	R.	.....
.....	...	...	.....
.....	Abort.	R.	Passage not found.
... ..	...	R.	.....
.....	...	R.	.....
.....	Living.	R.	.....
[ental disorder.	Alive.	R.	.....
.....	Abort.	R.	Passage not found.
.....	...	...	.....
iolent daily fits about 7 P.M.; tremors constant.	...	R.	.....
.....	...	R.	.....
.....	...	R.	.....
[itral systolic; memory weak.	...	R.	.....
.....	...	R.	Improved as soon as bougie was introduced for artificial labour.
	...	R.	Chorea ended in acute rheumatism.
	...	R.	.....
	...	R.	.....
	...	...	.....
			In sister case at removal

The President complimented Dr Buist on the importance of his paper.

Prof. Simpson agreed with the President as to the great interest and importance of Dr Buist's communication. The spirit in which the author had set himself his task and the style in which he had accomplished it were worthy of all praise. As to the prognosis that the President had suggested as possible to be drawn from the fatalities attendant on the cases where artificial delivery had been carried out, it was to be remembered that these were just the cases where probably the mischief would have run to a fatal issue if no interference had been resorted to. The practitioner would continue to treat the patient with arsenic, sedatives, and so on, as long as there was any hope of the chorea subsiding, and would only seek the evacuation of the uterus when there was a risk of death from sleeplessness and inanition. One would need to see Dr Buist's paper in print to appreciate his statistics, to understand the full value of them, and to ascertain, for example, whether they showed the influence of death of the fœtus on the progress of the chorea, and whether the prognosis was more favourable in women at the earlier or more advanced periods of life. In any case, it would add to the value of the Society's Transactions; and from the care in which the material had been sifted, the communication would be a standard of reference for future workers on the subject of chorea gravidarum.

Dr Haultain agreed with Prof. Simpson that the paper just heard was one of the greatest importance, and one which would remain as a reference on the important subject treated. He thought the reason of the somewhat common disappearance of chorea in the later months of pregnancy was that, like the sickness of pregnancy, it was a pure reflex neuroses. It was remarkable how early in pregnancy the symptoms of chorea might arise. In one case under his care the patient showed distinct choreic movements a day or two before the first menstrual period missed, and was confined at the full time, according to the date calculated from the menstrual history. This was a recurrent attack during her second pregnancy, and was not so severe as that suffered in her previous pregnancy, which was not in keeping with the usually accepted fact that multiparæ were more seriously affected than primiparæ.

Dr James Ritchie said that many observations had been made on the appearances of the nerve centres in chorea, but that the pathology still remained in a very doubtful position. The paper which the Society had just heard would, he thought, help to throw light on the matter, because it had been shown that many cases of chorea recovered very rapidly after the uterus was emptied,—with such rapidity that in these cases, at least, the existence of any serious organic change in the nerve centres was rendered impossible, and that in them the cause was some reflex nervous influence.

III. SOME OBSERVATIONS ON THE MATERNAL AND FŒTAL BLOOD AT BIRTH.

By GEORGE ELDER, M.B. C.M., and ROBERT HUTCHISON, M.B. C.M.

ALTHOUGH many observations have been made on the blood of children in health and disease within recent years, almost none of these have been made exactly at birth; and as it has been shown that the constituents of the blood alter very considerably within the first days, and even to some extent within a few hours after birth, we have thought it might be worth while to lay before the Society some observations made on the blood of healthy children *immediately* after birth. As we were able, besides, to examine in a considerable number of cases the blood of the mother at the same time, we have been able to contrast the condition of the blood of the child with that of the mother,—a contrast which is of some interest in the consideration of the state of pregnancy. The observations were made by us quite independently, between August 1893 and January 1894, in the Royal Maternity Hospital, where we had the privilege of being Resident Surgeons under Dr Croom and Prof. Simpson respectively; but as the results obtained are practically the same, we have thought it well to give the joint result.

Our observations were made, in the case of the child, from blood got from the umbilical cord when it was cut, and in the case of the mother, from the lobe of the ear during the latter part of the first or during the second stage of labour. We estimated the number of the red and white corpuscles by the Thoma-Zeiss instruments for the purpose (the hæmocytometer and leucocytometer), using the usual sulphate of soda and acetic acid solution for the former, and for the latter $\frac{1}{8}$ per cent. solution of acetic acid tinted with methyl-green. For permanent specimens films were made in the usual manner, hardened either in corrosive sublimate or in absolute alcohol, and stained either with Ehrlich's hæmatoxylin and watery solution of eosine, or with alcoholic eosine and alkaline methyl-blue.

Blood of Newly-born Child—Red Corpuscles.—The blood of children within a few hours or days of birth has been found to contain more red corpuscles than that of adults. Hayem found 5,368,000 per c.mm.; Sörensen, 5,665,000; Otto, 6,165,000; Schiff, 5,825,465; Gundobin (1), 6,700,000. Practically all these results, however, are got from children several hours to several days after birth. Most of the highest numbers given have been some hours—six, eight, or more—after birth; and Schiff (2) has asserted that this is due to the fact that during this time the child takes no nourishment, whilst it is losing fluid by perspiration, urine, etc., and accordingly, the total volume of blood being decreased, the proportion of solids (corpuscles) is increased, just as one finds, according to the same observer, that the number of corpuscles is greater in the morning,

after the fast of the night, than during the day, when the loss of fluid is made up for by the nourishment taken then.

Our observations being taken at the moment of birth are from this consideration of some value, although for comparison we have no figures of our own of the blood some hours after birth, as we found extreme difficulty in getting a sufficient quantity of blood from a child of a few days without pressing it out, which would, of course, completely destroy the value of one's results. In 6 cases, carefully observed, the figures varied from 4,100,000 to 6,750,000 per c.mm., the average being 5,346,560. The individual results were :—4,100,000, 4,150,000, 5,375,000, 5,825,000, 5,875,000, 6,750,000.[1] These results show that the blood of the newly-born contains *from* 350,000 *to* 500,000 *more red corpuscles per c. mm.* than does the blood of the adult.

Although our results correspond almost exactly with those of Hayem (3), they are below those of most of the other observers, and would tend to show that during the first day or two of life the number of red corpuscles per c. mm. increases. This has been explained by Hayem on the suggestion that a great many young corpuscles are thrown out into the circulation then; whilst Schiff, as already mentioned, explains it by the decrease in the total volume of the blood which then occurs, leading to a relative increase of blood corpuscles per c.mm.

Another point brought out by the figures given is the great variation in the number of corpuscles per c. mm. present, which is much greater than in adults, a variation which has been shown to occur, not only in the blood of different children, but of the same child at different periods.

These changes, which occur sometimes within a few hours, are evidently far too rapid to be accounted for by any processes of hæmopoiesis or hæmolysis, and are almost certainly due, largely at least, to rapid changes in the total volume of blood present, and they seem to show that the increase of red corpuscles per c. mm. soon after birth is not altogether due to rapid production of red cells, as Hayem has suggested, but to these variations in the volume of the blood.[2]

There has also been said to be a greater difference in the size and shape of the red corpuscles in children than in adults, but this we have not specially observed.

One point very noticeable, however, in the blood of newly-born children is the presence of nucleated red corpuscles, which are well seen in the stained specimens. They are present in considerable

[1] Many more cases were examined by us, both for estimation of red corpuscles and of hæmoglobin, but unfortunately the estimations have been mislaid. Roughly, however, they corresponded with those here given.

[2] After the second day there is a gradual decrease in the number of red corpuscles per c. mm., so that at the end of a fortnight the number is about 500,000 per c. mm. less than during the first day of life (Schiff).

numbers in all our specimens of blood from the cord, and are comparatively numerous, varying usually from 1–20 to 1–8 of the white corpuscles present. Occasionally the free nucleus of one could be seen, but we have not observed any with mitosis of the nucleus. In view of our result, it is interesting to note that Fischl (4), in two newly-born children, found in one case no nucleated red cells (erythroblasts), whilst in the other he only found five in 100 fields of the microscope. In other four children—one, three, ten, and twelve days old respectively—none were seen. He also draws attention to the difference of opinion on the subject, Hayem and Luzet (5) saying that erythroblasts disappear from the blood of the fœtus during the later weeks of pregnancy, whilst Neumann and Kölliker hold that they are common in the new-born. Loos (6) asserts that they are often not to be seen, whilst Hock and Schlesinger have found them present in healthy children.

There can, we imagine, be no doubt that erythroblasts are present in considerable numbers in the blood of the child at birth, although they seem to vary to a considerable degree in different cases. Woino-Oransky has asserted that after the fourth day they are not to be seen; and from specimens of the blood on the fifth day which we have examined where none were to be seen, whilst in those on second and third day one could see a few, we are inclined to agree with him that they disappear about this time.

We have recently had an opportunity of examining the blood from the heart of a dead-born fœtus of 6½ months, and found in it a very large number of nucleated red corpuscles. This would seem to show that during the later months of pregnancy the number of erythroblasts rapidly decrease, disappearing altogether a few days after the birth of the child.

Blood of the Mother at Parturition—Red Corpuscles.—It is interesting to compare with these figures the results got from the examination of the mother at parturition. In 16 cases examined, the number of red corpuscles varied from 2,900,000 to 5,000,000 per c. mm., giving an average of 3,978,937, which is considerably below the number present in the blood of the normal adult, and still more below the average number present in the child at birth. In every case the red corpuscles of the child were considerably more numerous than those of its mother; when those of the child were below normal the blood of its mother was still more anæmic, whereas when the mother's blood reached the average of the healthy adult that of her child was considerably above this,—nearly always was there 1,000,000 red corpuscles or more per c. mm. difference between them.

Compared with the standard of the healthy adult, anæmia is the rule in the mother, plethora is the rule in the child.

Hæmoglobin in Child.—Although there seem to have been fewer observations on the hæmoglobin of the child than on the red corpuscles, the results are much more unanimous. We examined the

blood of nine children with Gowers' hæmoglobinometer, and found that in these the hæmoglobin varied from 95 per cent. to 115 per cent., giving an average of 105·6.

If we remember that very few adults have 100 per cent. hæmoglobin, as reckoned by Gowers' hæmoglobinometer, and that probably 85 per cent. is a good average for healthy adults, it will be seen that there is a great excess of hæmoglobin in the blood of the newly-born child. This increase of hæmoglobin does not directly correspond to the number of red corpuscles present, as shown by the fact that in one child with 5,875,000 red corpuscles there was 98 per cent. of hæmoglobin, whilst in another child with 5,825,000 red corpuscles there was 112 per cent. Further, we think it is evident, for the reason given above, viz., that 100 per cent. is much too high a percentage for the hæmoglobin present in the blood of the healthy adult, that not only is the fœtal blood richer in red corpuscles, but that each corpuscle is richer in hæmoglobin than is the blood of the adult.

Schiff has shown that the quantity of hæmoglobin present decreases gradually during the first fourteen days of life, from 104 per cent. to 90 per cent., as estimated by Fleischl's instrument. This decrease is relatively greater than the decrease in the number of red corpuscles during the same period.

Hæmoglobin in the Mother.—In 7 cases examined, the hæmoglobin was found to vary from 60 per cent. to 83 per cent., giving an average of 72 per cent. It will be seen how very poor in hæmoglobin the blood of the mother is compared with that of the child, on an average containing only two-thirds as much per c. mm., so that the blood of the child is even relatively richer than the blood of the mother in hæmoglobin than in red corpuscles, marked though the latter is. The bearings of the great difference in the hæmoglobin of the child compared with that of its mother on the subject of intra-uterine respiration will be referred to later on.

White Corpuscles in the Child.—Though less attention has been directed to the white corpuscles in the blood of the newly-born than to the red, still a considerable number of observations have been made. Hayem found that in children within forty-eight hours of birth there was an average of 18,000 per c. mm.; Otto, 23,330 per c. mm.; Schiff, 26,000 to 36,000 per c. mm.; Woino-Oransky, 16,980 per c. mm. Although it will be seen that the results vary to a considerable extent, it must be taken into consideration that the observations of these authors were not taken under the same conditions as regards time after birth, relation to nourishment, etc.; and as it has been proved that the number of white corpuscles varies with these conditions, it is not to be wondered at that the results differ as they do.

In 12 cases where we examined the blood got from the cord at birth for the white corpuscles, the numbers varied from 12,200 to 26,500 per c. mm., giving an average of 17,884. The individual

numbers are — 12,200, 12,500, 13,200, 13,750, 14,375, 15,980, 17,800, 22,500, 22,500, 25,300, 26,500.

Roughly we found that there were twice as many white corpuscles per c. mm. as in healthy adult blood. The excess of white corpuscles is much greater relatively than the excess of red corpuscles, as shown by the relative proportion of the two, which from these observations is—1 white to 298 red in the blood of the newly-born, as compared with 1 white to 500 red in the blood of the adult. It has been shown by Schiff, Gundobin, and others, that the number of white corpuscles an hour or two after birth is not so great as it is twenty-four to forty-eight hours after birth, while after the second day or so the number gradually decreases. This increase of white corpuscles per c. mm. for a short time after birth has been said by Woino-Oransky and others to correspond in inverse ratio with the weight of the child, which decreases for the first two days and then gradually increases. We have seen that during the same period the number of red corpuscles also increases, —probably due, in part at least, to the volume of blood being reduced at this time.

But not only is there a great difference in the relative number of white corpuscles present in the blood of the newly-born, there is also some difference in the numbers of the different varieties of the white corpuscles. One finds the following varieties of white cells in the blood of the newly-born:—1, Small mono-nucleated ("lymphocytes"); 2, large mono-nucleated (so-called "transition" forms); 3, "neutrophile"; 4, "eosinophile." We have not seen any basophile cells in our specimens.

Lymphocytes in our specimens varied from 35 per cent. to 40 per cent., or a little more. This is higher than the proportion in the blood of the adult, where according to Kanthack and Hardy (7), even a few hours after meals, when they are considerably increased, they never at the outside exceed 30 per cent. of all white corpuscles, and are usually considerably below that. This relative increase in number of lymphocytes, however, is not so great as has been found by others (Loos, etc.), who assert that they exceed in numbers the neutrophile cells. In none of our specimens has this been the case, although in a few they approach pretty closely the neutrophiles in number.[1]

Large Mono-nucleated formed from 2 to 3·5 per cent. of all the white corpuscles in our specimens,—much the same as in normal blood.

Neutrophiles formed from 55 per cent. to 65 per cent. of the white corpuscles. This is below the number in the blood of the adult, where, according to Kanthack and Hardy, they form usually 75 per cent., or upwards, of all white cells.

[1] In the case of the 6½ months' fœtus already referred to, the number of lymphocytes was evidently even considerably greater than in the blood of the newly-born child.

Eosinophiles were from 1 to 2·5 per cent. In adults they form about 2 to 4 per cent., so that they seem to be relatively slightly scarcer in the blood of the newly-born.

White Corpuscles in the Mother.—It has long been known that during pregnancy the number of white corpuscles is increased. Our observations merely confirm this. In 11 cases examined by the leucocytometer, the number of white corpuscles varied from 8000 to 25,000 per c. mm., giving an average of 14,522. It will be seen that this average, though much higher than that of the normal adult, is somewhat below that of the newly-born child. Although, however, we met no case where the number of red corpuscles of the mother equalled that of her child even approximately, in the case of the white corpuscles the numbers of the mother and of her child were in some cases practically identical.

In a few cases (6), where some days after delivery the blood of the mother was again examined, once or oftener, it was found that the number of white corpuscles had considerably decreased,—except in the case of one patient, who, as it happened, was the only one who did *not* suckle her child. In her case the number of white corpuscles was increased. One cannot, of course, however, deduce anything from an isolated case.

Summary.

1. The blood of the newly-born child is relatively richer in red corpuscles than that of the adult by 350,000 to 500,000 per c. mm.

2. For a short time after birth (up to about two days) the red corpuscles seem to increase in number. This is probably due to the fact that the total volume of blood is less, from the fluid lost from the body during this time being in excess of that absorbed. Thus concentration of the blood is produced. After the second day or so the red corpuscles gradually decrease.

3. The number of red corpuscles varies much more than in adults, probably because of greater variations in the total volume of the blood.

4. At birth there are always present a considerable number of nucleated red corpuscles. They vary, however, in number in different cases.

5. About the sixth month of intra-uterine life the number of nucleated red cells is very much greater than at birth. They probably rapidly decrease in number during the later months of pregnancy, and altogether disappear from the blood a few days after birth.

6. The blood of the newly-born child is relatively much richer in hæmoglobin than the blood of the adult.

7. Not only is this so, but the individual red corpuscles are richer in hæmoglobin than those of the adult.

8. The blood of the mother at parturition is anæmic.

9. In any individual case the blood of the mother is consider-

ably poorer in red corpuscles per c. mm. than that of her child, and it is still more deficient in hæmoglobin.

10. Both the blood of the mother and that of the child contain a larger number of white corpuscles than normal adult blood. The blood of the mother may be quite as rich in white corpuscles as that of the child.

11. The blood of the child contains a distinctly larger proportion of lymphocytes and a distinctly smaller proportion of neutrophile leucocytes than the blood of the adult; the number of eosinophile cells seems to be slightly deficient.

12. At the sixth month this excess of lymphocytes is probably even more marked than at birth; they probably decrease during later months of pregnancy.

13. After parturition the number of white corpuscles in the blood of the mother (at least of those who suckle their children) decreases markedly in a few days.

General Considerations.

Although most of these results have already been obtained, yet a consideration of them is of interest, whether one looks to the vital processes going on during intra-uterine life, or to the question of the life-history of the cell elements of the blood. We intend at present only to refer briefly to one or two of the more prominent ones.

The great difference between the constitution of the blood of the mother and that of her child would altogether dispose of the idea of any mixing of their bloods, even if histological investigation had not already proved that this did not occur.

The remarkable richness of the blood of the child in red corpuscles, and more especially in hæmoglobin, over that of its mother is extremely important when one considers the question of intra-uterine respiration and metabolism. There can be no doubt that the excess of hæmoglobin, and consequently preponderance in oxygen-carrying power on the part of the blood of the child, must be one of the most important means by which its metabolism is carried on as it is, and yet although this excess of hæmoglobin has been long known, its importance is not usually drawn attention to in this connexion. When one remembers that the child's blood can only be oxidised in an indirect manner through the blood of the mother, and that consequently it is possibly in a comparative state of cyanosis, one can at once see how valuable it must be for the child to have a great quantity of red corpuscles, and especially of hæmoglobin, in its blood to compensate for this. And it is interesting to notice that in children with congenital malformations of the heart and cyanosis one also finds this great excess in red corpuscles and hæmoglobin (8), which in this case also is probably compensatory.

After birth, when the child's blood is directly oxygenated by

being brought into close relation with the air in the lungs, there does not seem to be any longer a necessity for this excess of hæmoglobin, and so one finds that during the first fortnight of extra-uterine life the amount of hæmoglobin in the blood rapidly decreases.

The excess of hæmoglobin and of red corpuscles in the blood of the child *in utero* also shows that the life of the child is to a certain extent parasitic,—*i.e.*, that it has a certain amount of independence. In cases of anæmia, for instance, the blood of the child does not seem necessarily to suffer *pari passu* with that of the mother; but, on the contrary, the child seems to get more than its fair share.

As a rule, however, in any two cases the blood of the child of the more anæmic mother would probably contain fewer corpuscles and hæmoglobin than that of the child of the less anæmic mother.

These results do not throw so much light on the life-history of the cell elements of the blood as one might at first be inclined to suppose. The presence of a larger number of red corpuscles in the child's blood is not necessarily a proof that the blood-forming glands are more active in the child.

The mere fact that there are more lymphocytes in the blood of the child at birth, and even still more during intra-uterine life, than in that of the adult, is not a proof that the lymphocytes develop into other leucocytes.

The age of the organism does not necessarily bear any relation to the age of its individual cells. One cannot, therefore, take for granted that in the fœtus there are a larger proportion of young white corpuscles than in adults; and so although there are more lymphocytes in the newly-born child, it is not to be taken as proved that these cells (lymphocyte) are young cells. The excess of lymphocytes may be explained in many other ways.

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5. Luzet.—*Etude sur les anémies de la première enfance.* Paris, 1891.
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9. Gibson.—*Lancet*, January 5, 1895.

Prof. Simpson said he had listened with great pleasure to this communication. It belonged to a class of scientific investigations which were relatively rare in their Society, but of great practical importance eventually in relation to the problem of the interchanges that took place in the placenta between the maternal and fœtal blood. He (Prof. Simpson) was very pleased to find that two of the younger Fellows of the Society were giving their attention to this difficult subject, and hoped that Dr Elder and Dr Hutchison would continue their investigations, which were sure to throw further light upon it.

Dr Milne Murray had listened with much pleasure to the record of the careful observations made by Drs Elder and Hutchison in a department of physiology which had long appeared to him to be of profound and vital interest. The problem involved in explaining the interchanges in the placental circulation had been scarcely touched on by the physiologist, and this investigation was certainly involved in much difficulty. As bearing on this subject, the observations recorded in this paper, which were confirmation of Hayem's, as to the greater relative proportion of hæmoglobin and corpuscles in the fœtal as compared with the maternal blood, were of great interest and importance. But it seemed to him that while they might bear upon, they did not explain the fact that oxygen left the maternal side to enter the fœtal side of the placenta. He had been carrying out, as occasion offered, an investigation as to the spectroscopic qualities of the fœtal and maternal bloods, and though this was not completed, he might venture to direct attention to one observation which he felt was of importance in this bearing. He had found that fœtal oxyhæmoglobin was much more difficult of reduction by the usual reducing agents than was the maternal oxyhæmoglobin. This fact would in certain measure account for the transference of oxygen from one side to the other, by reason of a higher chemical affinity on the part of the fœtal hæmoglobin, and, of course, pointed to a difference in the molecular constitution of the two hæmoglobins. He hoped soon to be able to give a further account of these experiments. Meantime he congratulated the authors of the paper on the work they had done, and hoped they would continue their researches on this most interesting matter.

Dr James Ritchie said that it was frequently necessary to warn pregnant women that they ought to take abundant open-air exercise, in order that their own blood might be rendered as healthy as possible, and that thereby the constitution of the child should be fortified. The very interesting paper which had just been read afforded additional evidence of the value of this line of treatment, because it proved that the quality of the blood of the newly-born child depended, both as to number of coloured corpuscles and as to amount of hæmoglobin, on the quality of the mother's blood.

MEETING VIII.—JULY 10, 1895.

Dr A. H. FREELAND BARBOUR, *President, in the Chair.*

THE second annual afternoon meeting was again held in the Waterloo Hotel, and was attended by a large number of Fellows of the Society and other distinguished members of the profession.

I. Profs. A. Martin (Berlin), A. J. C. Skene (New York), and Pinard (Paris) were elected Honorary Fellows of the Society.

II. *Dr J. W. Ballantyne* exhibited a case of ANENCEPHALY, WITH RETROFLEXION OF THE SPINE AND DOUBLE HARE-LIP AND CLEFT PALATE. The specimen had been sent to him by Dr J. D. Farquharson, of Newcastle-on-Tyne, to whom he was also indebted for the following notes of the history of the pregnancy and labour which resulted in the birth of the teratological fœtus:—The mother, a iv.-para, a small, wiry woman, 5 ft. 3 ins. in height, and 27 years of age, is of a distinctly neurotic temperament, and a "martyr to neuralgia." She had what she calls "a very rough time" at her first confinement, but had comparatively easy labours with the next two. She is well made, active, and intelligent, and there is neither disease nor displacement of the uterus or annexa. During her present pregnancy she suffered much more than usual from sickness, and lost much of her wonted activity, and suffered a good deal from mental depression. She increased very rapidly in size, quickened at four and a half months, and the fœtal movements were so vigorous as to frequently bring on fainting fits. As the pregnancy progressed she felt better in herself, only complaining of the discomfort attendant upon her extreme distension. A week before her labour, which came on between the eighth and ninth month, she measured round the umbilicus 42 inches. Early on the morning of the 27th of May I was summoned, and found her sitting on a chair in the bedroom, and the waters, which had just broken, forming a considerable pool around her. As the nurse described it, the patient had been "fairly washed away." On removal into bed and an examination made, a foot was found in the vagina, with the os well dilated. Slight traction on the presenting limb was followed by two or three smart pains and the expulsion of a female child, which was alive, and continued a separate existence for about twenty minutes. It presented the usual characters of anencephaly, the vault of the cranium being entirely absent, and the cavity occupied by blood-clot and cerebral fibres; and the spinal column was an open canal down to the lower dorsal vertebræ. (Really much lower, for there was retroflexion of the spine.—J. W. B.) Deformity had also run riot, and added a double hare-lip and cleft palate. The fœtus otherwise was fairly well nourished and well grown. The family history throws some

light upon this case. The three previous children born are all alive, and the eldest and youngest are quite healthy, though not bright children. The second is hydrocephalic, and subject to fits. The mother, as stated, is distinctly neurotic, but a bright, active woman. Her parents are both alive and well, and one brother and sister, the only other members of the family, are healthy. The parents of the father were full cousins, and the father himself is, though physically healthy, subject to frequent moods of extreme depression, or equally exaggerated periods of exaltation. A brother is in a lunatic asylum, and a sister is stated to be "queer." No history of a maternal impression during pregnancy could be traced. In over 2400 labours attended by Dr Farquharson anencephaly has occurred four times, and in all the sex was the same (female), all were accompanied by extreme hydramnios, in all the presentation was breech or footling, and in all a decided neurotic taint could be traced in one or other of the parent's families. Four photographs illustrating the appearances of the fœtus were shown. The specimen weighed 855 grammes.

III. Discussion—Should Midwives be Registered in Scotland?

The President said that the subject for discussion that evening was the Condition of Midwives in Scotland, with special reference to the question of Registration; in other words—Should Midwives be Registered in Scotland? Dr Hart had agreed to open the discussion. After that it would be thrown open. Fellows might speak in any order, and they hoped that the country Fellows would contribute, because they had more experience of midwives in country places. After Dr Hart had spoken, the time allotted to each speaker would be seven minutes.

Dr Berry Hart then opened the Discussion by reading the following paper on The Proposed Midwives Registration Bill:—

The subject of Midwives, their status, and the advisability of registering them, has for some time been the subject of attempted but as yet abortive legislation. These attempts have been subjected to very severe criticism and disapproval by a large number of the profession, especially in England. The introduction of a Midwives Registration Bill into the House of Lords by Lord Balfour of Burleigh, on May 14, 1895, and the fact that it passed a second reading, has brought the question acutely before the medical profession of this country; for though the Bill is only to apply to England, there is little doubt that if passed it will soon be extended to Scotland and Ireland.

Our President and Council have done wisely, therefore, in proposing this question for discussion at a general meeting. The sudden, if not unexpected, dissolution of Parliament has un-

doubtedly postponed this Bill, but it will in all probability soon be reintroduced, and it will be therefore of great advantage for the profession in Scotland to consider the matter during this breathing space fully and calmly. The discussions on this question have been conducted in England with an amount of feeling which the word considerable inadequately expresses. In Scotland it has attracted comparatively little attention, but I hope the result of our meeting to-day will be to direct the attention of all to a most important subject. Before passing on to describe the intention of the Act, I may be permitted to say that it is a matter for congratulation that the Bill has been in the hands of a statesman like Lord Balfour of Burleigh, who has shown the greatest tact and fairness in the discussion of a difficult and thorny question. The selection of Sir William Turner, too, as Chairman of the General Medical Council's Committee on this subject, is also a matter for congratulation, and is a guarantee for a consideration of this question as able as it is important.

The Bill is entitled, "An Act for the Compulsory Registration of Midwives, and may be cited as the Midwives Act, 1895."

The main reason for its introduction may be given in the following extracts from Lord Balfour's speech in introducing the Bill:—

"He supposed their Lordships would expect any one who undertook to move the second reading of this Bill to prove to the House two things—firstly, that an undoubted evil existed; and secondly, that the remedy proposed proceeded on safe and wise lines, and would not bring in its train evils greater than those which now existed, or even any evils at all. Anyone who studied the returns of the Registrar-General would see that there were in this country between 800,000 and 900,000 births, and he thought it would surprise many of their Lordships when he said that more than half of these births were attended by midwives only, without any intervention on the part of a fully qualified medical man. . . . It was also universally acknowledged that the great majority of the midwives who attended those cases were almost wholly, if not wholly, untrained, and were, in too many instances, lamentably ignorant of the important duties they undertook to discharge."

The College of Physicians in 1891 had passed the following resolutions:—"(1.) It appears there are from 10,000 to 15,000 midwives practising in England and Wales, many of them entirely uneducated and incompetent. This must be taken as an existing fact that cannot be ignored. (2.) Midwives are under careful state regulation in all the other principal countries of Europe, and, in the opinion of your Committee, the education, examination, and registration of midwives in Great Britain are urgently required in the interests of the women they attend" (p. 4).

To meet these evils, the main propositions of the Bill are as follows:—

1. "The term 'midwife' means a woman who undertakes to

attend cases of natural labour without the direct supervision of a medical practitioner" (p. 1, Clause 2). In the amended Act, however, no definition of the term midwife is given.

2. "No woman is after a certain date to be allowed to call herself midwife unless registered under this Act. The registered midwife can recover fees, but is not to be qualified to grant a certificate of death or still-birth" (p. 2, Clause 4).

Clause 5 is a most important and remarkable one: "Any woman who at the passing of this Act is in *bonâ fide* practice as a midwife, or has obtained a certificate in midwifery . . . . . and claims to be registered before the expiration of two years from the passing of the Act, and produces the prescribed evidence of her title to be so registered (such title to be determined by the General Medical Council), shall be entered on the Midwives' Register at such reduced fee as the Midwives' Board shall prescribe."

So much for registration. What as to education? A Midwives' Board is to be formed, "which shall consist of twelve registered medical practitioners, three to be appointed by the Royal College of Physicians of London, three by the Royal College of Surgeons of England, three by the Society of Apothecaries, and three by the Incorporated Midwives' Institute, and of three persons in addition, to be appointed by the Lord President of the Council, of whom one at least shall be a woman."

In regard to the Incorporated Midwives' Board, it seems to have been difficult for the General Medical Council to obtain information, but, so far as the *Lancet* reports go, the members seem to have been satisfied, although the only definite fact there stated was that its patrons were eminent, and included, among others, the Governor of the Bank of England. The Midwives' Board is to make rules as to examination of candidates, to conduct the examinations, to prepare a register, to frame rules as to admission to the register of so-called *bonâ fide* midwives, to frame rules for regulating the practice of midwives,—in fact, to carry out the provisions of the Act. In regard to the rules for the admission of *bonâ fide* midwives to registration, and those regulating the practice of midwives, the General Medical Council are to exercise supervision, and the rules so framed by them are to be submitted to the Privy Council.

The Midwives' Register is to be under the custody of the Registrar and Secretary of the Board, and the local supervision is to be undertaken by the Midwives' Board (Act, p. 4, line 33.) This clause runs as follows in the Bill as amended on Report (p. 5, line 33):—"Where a registered midwife is convicted of any felony or misdemeanour, or on an inquiry held by the Midwives' Board, either on a complaint under this Act or otherwise, is found to have been guilty of professional misconduct, the Midwives' Board may remove her name from the Midwives' Register."

Penalties are to be inflicted on any woman who obtains regis-

tration fraudulently, but there are no penalties specified for *malpraxis*. The Midwives' Board, as already pointed out, attends to this.

There are very evident defects in the Bill, but we must keep before us prominently the fact that the question dealt with is a very difficult one. I do not believe any perfectly satisfactory solution will be found, and our aim must be to obtain the most satisfactory compromise possible. We must keep specially in mind that "no State licence is required by law to enable women to practise midwifery, either gratuitously or for gain," and that thus any woman can legally call herself midwife if she choose. It is very doubtful if the law will hinder a woman calling herself midwife, and in any interval existing rights will be tolerated.

This Bill has been severely criticised, and its main defects are clearly pointed out in the resolutions of the General Medical Council passed on June 5, 1895. These point out the defects in regard to the registration of so-called *bonâ fide* midwives, and specially recommend removal from the register for infringement of rules of practice. Practically, we may sum up the objections as follows:—

1. It is admitted, in the words of Lord Balfour, that about 500,000 births are attended yearly by midwives in this country, and that these midwives are "in too many instances lamentably ignorant of the important duties they undertake." Yet it is proposed to register these women on simple application, and without any examination or certification. For the next twenty years, therefore, all ignorant midwives will probably be entitled legally to attend women in labour, and will have an inferior medical status.

2. Registration is not education, and as a matter of policy we should strenuously resist any such proposal of registration until we know what previous training and education is to be demanded.

3. No provision is made for the education of candidates for registration. It is very doubtful if in this country we have hospital accommodation sufficient to give the requisite practical training. This point should be strongly urged on the Legislature.

It is in making any proposals on this point that one really feels the great difficulty of the question. It is with great diffidence that I therefore throw out the following suggestions.

It is doubtful if we can persuade the Legislature to interfere with the right of any woman to call herself midwife. Might we not, as a compromise, have registered midwifery nurses, from whom at least a six months' hospital training, followed by an adequate examination, should be exacted. The advantages of this would be that the public would more readily understand the position of such, and that the women themselves would not be put in the false position of being considered duly competent to attend labour cases on their own responsibility.

Midwifery is a complex subject, and not one to be mastered in a few months by a woman with a preliminary education of the most meagre description, and with not only an entire lack of any scientific education, but a complete inability to grasp the most elementary scientific facts. No midwife is competent to attend labour on her own responsibility. It is stated that she is to attend only natural labours; but this presupposes the power to discriminate natural and unnatural cases. While the majority of cases need no help, a certain number will, and if not given in time the results may be most disastrous.

The evolution of midwifery training has been from midwife to skilled medical practitioner, and we should scrutinize most warily any attempt to reverse this process.

Such a registered midwifery nurse would be competent to ascertain when a labour could terminate naturally, and, if in doubt, would feel no diffidence in calling in skilled help from the practitioner. In certain cases I see no reason why the practitioner should not first see the patient, and in a natural case hand over its care to the registered midwifery nurse, with instructions as to when his help might be required. This, I think, would be a boon in country districts; but on this point I hope we shall get information to-night.

How this might work in large towns like Glasgow, Dundee, Leith, etc., is also a matter for consideration to-night.

I have no wish further to trespass on your time, but I wish to suggest, in closing, that we might ask for information on the following heads:—

1. What preliminary education and actual hospital training should be demanded of such registered midwifery nurses?

2. Have we in Scotland sufficient facilities for hospital training, and should the Government not be pressed to subsidise hospitals where necessary for such purposes.

3. What demand is there for such registered midwifery nurses in country districts and large towns in Scotland?

4. What instances of neglect or *malpraxis* have come under practitioners' notice as the result of the ignorance of midwives? On the other hand, any one knowing of good results from the employment of midwives will find his evidence welcome.

I had intended to have considered, in conclusion, the question of the results of the employment of midwives abroad, especially in Germany, but this would have taken up an undue amount of time, and I have therefore passed it over without further reference.

The position I take up may be finally summarized as follows:—

Keeping in mind the unlikelihood of unqualified women being prevented by law from styling themselves midwives, the danger of legally creating an order of registered midwives when we know that in this country we have no means of adequate training for them; remembering that the midwife has been tried and found

wanting, and that the science and art of midwifery have been advanced only by the skilled medical practitioner, should we not strongly urge on the profession the importance of having trained registered midwifery nurses, who shall only act under competent and accessible medical supervision? Without a thoroughly comprehensive scheme of practical training, the present Government proposals will only lead to serious disaster.

The President said he understood that Dr Hart had, in opening the discussion, spoken against this Bill for the registration of midwives. If any Fellow was prepared to speak in favour of the Bill, they would be glad if he would continue the discussion.

Dr Buist said he felt in favour of this Bill, and that was not merely his personal opinion, but was a fair representation of the opinion of the medical profession in his district—viz., Dundee. There was very good ground for it. Within 300 yards of his house there were eight or nine midwives in actual practice. He came across their work pretty constantly, and could, therefore, speak from personal experience of the conditions under which they worked. Another thing that made them feel pretty keenly on the subject was this, that many of the population of Dundee were so poor that they could not afford to pay a fee of 15s. or the guinea which many of the profession preferred to charge; and the alternative of handing these over to some other system of management was, that they should be content to work for 10s. or 10s. 6d. They felt that was not a very satisfactory conclusion of the matter. Their experience of midwives' practice led them to fancy that, under proper conditions, they could be trusted to manage a great deal of the work. A great number of difficulties had been raised on this question of registration which seemed to him entirely extraneous, and introduced for the purpose of obstructing discussion. The bulk of English criticism was that they were creating a new order of medical practitioners, who would be allowed to certify still-born children for interment, to treat miscarriages, and to perform a great many other medical functions, and who would be quite free from supervision and control. As matters stood, however, they had no guarantee that a midwife would not certify still-born children, or that she would not undertake to manage complicated cases. They had no control, no power over her. The only penalty was an action for malpractice on the part of the patient. If they gave these women, after satisfactory conditions of training and experience had been insisted on, the special privilege of registration, they had at once a penalty they could inflict. As with a medical practitioner, they could strike her off the register; and there was also the liability for damages. With regard to the satisfactory nature of a certain amount of midwives' work, he thought he had had in midwives' practice four cases of placenta prævia. To three of them he was

called by a fairly competent midwife. In each case she sent him a message telling him what was wrong. When he got there he found she had already ruptured the membranes, and so far the treatment was safely conducted, and he knew exactly what he had to take with him. In the practice of that midwife he had had a good many other difficulties to deal with. He found that in almost every instance she could tell him beforehand the nature of the complication, and he went therefore prepared to undertake interference. She exercised several functions which she should not be allowed to do. Suppose a patient with a high temperature during the puerperium, which she could detect, she had no hesitation in giving quinine, antipyrine, phenacetine, or other drug, however dangerous or uncertain its action might be. If they put her on the register, they would have the power to say that the administration of drugs was malpractice, and could deprive her of her certificate. He had a fourth case, which was a great contrast to these other cases. In another case, also in the hands of, he thought, a registered midwife, a patient came to hospital suffering from albuminuria. She had been dosed steadily for days with opium pills, on account of swelling. That also would be malpractice if midwives were registered. In the case of unqualified women he had had unsatisfactory cases to deal with; a shoulder case, in which ergot had been steadily given, and a face case, which had been neglected until an attack of ophthalmia was almost inevitable. Ophthalmia neonatorum had been brought forward against registration, but seemed to him an argument in favour of registration. If a midwife had a case of ophthalmia in which she did not call in a registered medical practitioner, her certificate could be removed. He put the question as entirely one of cost. The people whom midwives attended were, in nine cases out of ten, too poor to pay the ordinary fee, and unless they introduced some other system of meeting that difficulty, no legislation would get rid of midwives. One way of getting rid of the difficulty was to leave them just as at present, to prescribe, certify still-born children, and neglect patients as they chose, subject only to the risk of an action for damages. They had also the alternative of the Poor Law, but they knew how strong the objection was to calling in the Poor Law medical officer. He did not think that this would be sufficient. Another proposal was to change the Poor Law, or introduce a system of dispensary treatment. Another possible system was that people should be asked to insure against confinement, and that would be all very well; but, unfortunately, in most cases they came from classes so poor that they did not insure against sickness. The last was the alternative he had already referred to—viz., cheap medical work. There was one outlying district of Dundee in which this cheap medical work was done, and he did not think the work was done more satisfactorily there than by midwives in the town. If the work were paid for

to a certain extent, it would be performed to that extent, and very little more. Another proposal was to have midwifery nurses, under the superintendence of the medical practitioner. But to call for nurses who could only attend in addition to the medical practitioner was simply to make the difficulty greater. Instead of protecting the poor, they were only providing additional protection for the rich woman.

Dr J. Connel said that he would like to state the feeling with regard to this matter in the country. He must say, *in limine*, that he was entirely with Dr Hart in his preferring registered qualified nurses to registered midwives, and although he felt the difficulties expressed by Dr Buist, he could testify this, that whereas thirty years ago in the country it was quite usual for women to send for a sensible neighbour or a woman who professed some practice, it was now accounted entirely bad form, whether they intended to pay the practitioner or not,—often they did not. They did not find more than one or two cases in the year where they had been dependent entirely on a neighbour or one calling herself a midwife. There seemed a reason in the nature of things at the bottom of that, and it was this:—That in proportion to the improvement of medical education women had come to see that midwifery was a branch of medical practice which required special education and special skill. They had got to see that specialism was a thing to be trusted to medical practice, and that no one without scientific knowledge and skill was to be trusted. That was to be kept in view, and the reason why in poor districts people still sent for neighbours and those unskilled was that they did not know any better. If the general feeling of the public was that medical skill was a good thing, then the poor would claim the best medical skill. If they were going to register midwives, why should they not register bone-setters? People in the country, and in the town also for that matter, consulted them. For some cases the bone-setter deserved credit, for others he deserved something else. There were, it was true, bone-setters who had advised bold methods of treatment,—*e.g.*, in breaking down adhesions, which had been adopted by surgeons since. But that afforded no argument that those who had acquired experience as farriers, blacksmiths, etc., should be registered. If those were matters that they would not think of relegating to any but the best surgeons, why should the practice of obstetrics be relegated to any but the skilled? Let them improve the breed of nurses, give them better education, and rest the responsibility on the educated medical man, and he saw from his experience of the country population that public opinion would bear them out. It was said that those women should take charge of natural labour; but who could define natural labour? Their anxiety hardly began until after the child was born. It was when the labour was half through that they were anxious, and the most simple and rapid case might present appalling complications in a

very short time. The midwife's presence of mind might readily fail and the case die on her hands. He supposed the wife of the poor man was the most precious thing to him. Her death was certainly an appalling catastrophe for him. Why should they countenance legislative proposals that would carry them back to the Middle Ages? In his childhood he used to see boards up here and there advertising midwives, but now the tide of feeling was rising that obstetrics, as Dr Hart had remarked, was a branch that required the highest scientific and practical skill. Why should they go back to the practice of the Middle Ages? If they were going to give the poor this benefit, let them insist on the insurance of pregnant women. Women could forecast the condition for six months at anyrate. That was a matter of public health as much as keeping the drains of a house right. Why should not Lord Balfour, when public opinion was sufficiently formed, bring in a Bill to the effect that no woman should be pregnant without having made preparation for labour? The fact that a woman now thought it bad form, to use the vulgar phrase, to have a child and no doctor attending her, was a proof that they considered it a matter of medical knowledge and skill, and the aim of legislation should be to keep that knowledge in the hands of skilled persons, and not to make laws which led them back to an earlier state of development.

Dr S. Macvie said one reason which would induce him to keep quiet was the fact that in Berwickshire he had not heard of a midwife. When he was in such a country town as Strathavon he had no dealings with midwives at all. He had heard of an occasional attendance by a midwife, but never came in contact with them. As a matter of fact nobody would employ them if there was a doctor to be had. That was true in Shotts Ironworks, true of Strathavon, and of the whole parish of Avondale, and still more true of Berwickshire. He had never seen or heard of one in Berwickshire. The feeling among the working classes there was simply this, that they would rather defer payment of their house rent than putting past money enough to pay for a doctor, so that the wife might have skilled attendance at a very critical period, and that the husband might not be left absolutely miserable with a small family on his hands. He believed, with Dr Buist, that it came to be a question of cost. Because poor people said they could not afford to pay, was that a reason why they were to be helped to inferior skill? If a poor man said he was not prepared to pay £5 a year for his house, would Lord Balfour bring in a Bill to abolish the Public Health Act and permit this man to occupy an unhealthy dwelling? The question of cost was one they should not altogether yield to. He perceived the difficulty in meeting it on this ground, because they laid themselves open to a charge of trades unionism outside. There was no medical man he had come across against whom such

a charge could be laid without injustice. The whole tendency had been to improve the graduate, what with larger fees, extra classes, and extended curriculum. It was not to his interest to begin with a large expenditure of capital. It was not in the interest of the student, but in the interest of the public. They had permitted ladies to enter the medical profession largely in order that they might take upon themselves a great part of midwifery duty, and he believed that these ladies would be doing a large share of midwifery duty in their own sphere, and would it not be rather hard on the lady medical practitioners to attempt to set up against them unqualified medical practitioners? They had practically abolished the male medical unqualified assistant, even in England —in the north of England at anyrate—and it seemed that this must be a backward movement to give status to unqualified midwifery practitioners. He agreed with Dr Buist and Dr Berry Hart that it was really a matter of poverty, caused, in a great many cases, by imprudence; because the better classes of workers who were thrifty did not call in midwives. That was his experience. Dr Buist had evidently more experience of that question than he had. If it came to be a question of cost merely, would it not be possible for such things as clubs to be started? He knew that in collieries half the midwifery fee was embraced in the weekly payment. As for assistant nurses, if a doctor were once called in, depend upon it the people would not care for anybody else, and therefore the assistant nurse would be of little use. If the doctor said, "I am too busy to attend you; yours is a common case," that would not satisfy the patient. The doctor, if once called in, must be there all through.

Dr Ballantyne (Dalkeith) said that he had not heard the whole of this discussion, but his own feeling was that things should remain very much as they were at present. He did not think there was any advantage either to patient or doctor in having special registered nurses. He thought such women should be fully medically educated. Dr Macvie had said something about the matter of cost. He thought medical practitioners were sometimes very much to blame themselves in regard to that matter. He knew his respected friend Dr Anderson never thought of charging a fee unless offered it by the poor working people,—never thought of sending an account. He hoped that kind of practitioner was dying out, because it made people feel that the service was not worth very much when they got it for nothing. It also hurt the medical practitioner in other ways, made him form the habit of doing a lot for nothing, which out of respect for his fellow practitioners and others he should insist on being paid for. He did not think he had much more to say on the matter. With regard to qualified midwives, as one gentleman remarked, one had been successful in diagnosing the condition of matters. He himself had come across midwives of this kind. Others were very stupid, but that was just the way of

humanity in general, and they could not expect to find the former every day.

Dr Lucas said that his experience of midwives had invariably been among those women who had been educated in Edinburgh and had gone through a systematic course of training suitable for women. These women, he found, acted admirably under the direction and with the sympathy of the medical man. In the district in which he practised he had times without number been called in by these women,—in the rural district around Dalkeith, and in Dalkeith itself. He never saw any mishap yet. Forceps cases, cases of convulsions, and hæmorrhages had been attended by these women in such a manner as to throw no reflection on the midwife or medical man. He thought the life of a practitioner in the country who was in full practice and willing to do his work without the help of midwives and midwifery nurses would be intolerable. It was, however, a commercial question. There were surely quite enough medical men in Britain to attend to all the cases that occurred. Why did they not do so? Simply because if a man was in full work he could not be expected to rush about attending midwifery cases for nothing or next to nothing. Trained women under medical men coped with the whole difficulty. As far as his experience had gone he had never met with any difficulty in the matter.

Professor Simpson said that he had not heard the whole of the discussion, but since he had been asked he would express the feeling that he was very much in sympathy with Dr Connel and the other Fellows who had spoken since he came in. Sympathising as he did very much with the difficulty in regard to the whole question, he yet felt strongly that the development in our country of a special group of women with a special title and who should have a special status in the community was an extremely dangerous experiment, and when the thing was brought forward at all he was profoundly glad to see that the experiment was not to be made on Scotland, but on the more vile body. There were difficulties on either side, but the worst thing that could happen would be that there should be a group of women imperfectly trained, who should be incapable of encountering midwifery as it ought to be met and could only be met by those trained in the whole of the medical arts and sciences. They had a group of women—it was possible that after six months' training at the Maternity they might be more capable—who even after three months' training were extremely helpful, and he did not know that registration would greatly add to their qualifications, or would give a satisfactory guarantee against inefficiency. Registration of a certain group of women would add immensely to the work of the Medical Council, already so exacting. In this era of programme-making, some of our legislators, besides making proposals for old-age pensions, would do well to consider whether due provision could not be made for the poor women who were

about to become mothers. Great care was taken of the lives of our soldiers. The women in child-birth ran as great risks as any of their sons on a field of battle.

Sir Wm. Turner said that he felt great hesitation in discussing the Midwives Registration Bill, as he had absolutely no knowledge or experience of midwifery practice. He had had as a student the "six cases," and he experienced so much, he might say, disgust at the practice, because it was conducted in the slums of London in the summer time when insects prevailed, that he was glad that he took up a branch of the profession which did not require him to attend women in labour,—so that he had had no experience; but still as a member of the profession who had had thrust on him, very often unwillingly on his part, a good deal of public work connected with the profession, and as during the spring of the present year the Medical Council imposed on him a duty which he did not in the least wish to discharge, namely, to act as Chairman of a Committee appointed to inquire into the Midwives Bill introduced by Lord Balfour of Burleigh, it was necessary that he should apply himself to the consideration of this matter to the best of his power. The Bill now put into his hands by Dr Hart, entitled a Bill as amended on Report, was a very different thing from the Bill submitted to the Medical Council. It was improved, or the reverse, he could not say which, in many ways, so that at first one hardly recognised it. Any criticism on the Bill as it was originally presented to the House of Lords fell to a large extent now entirely on one side, and what they and others who took a serious interest in this matter had to consider, was not the original Bill, but the Bill as amended on Report. As Dr Hart stated, the definition of midwife had entirely dropped out. As it was proposed to be defined in the original Bill, the term meant a woman who undertook to attend cases of natural labour without the direct supervision of a medical practitioner. They would observe that it was important to keep before them that this definition was a limitation. It limited the term midwife to a woman who undertook to attend cases of *natural* labour. The amended Bill striking out the definition practically admitted that midwives could attend all cases of labour whether natural or unnatural, which was a very much wider reading of the term. Those of them who objected to the definition as laid down in the original Bill had still more reason to object to the Bill as amended on Report, because there was no limitation at all to the cases that registered midwives might attend. Dr Hart had referred to the term midwifery nurse, and had expressed his preference for that term. This was argued at great length in the Medical Council, and they had more than one division on the matter. He should like to state one objection to the term, which weighed with him in voting against the change of term. It was said that the midwifery nurse should be on the same lines as the surgical nurse or medical nurse. The duties of

these were solely to act under the medical man or surgeon. They had no initiative. It was intended in this Bill, and the practice of centuries had shown that midwives had to exercise initiative, *i.e.* were to be called in to treat women in labour and to relieve them from the burden they were suffering from. If they were to make a new title, say midwifery-nurse and not midwife, they must give an entirely new definition of nurse. A nurse must be a person who was to take an initiative. Those of them who advocated the view that the term midwifery-nurse must be substituted must meet this objection. He ventured to state that they would find strong objections to the substitution of the new title. Just running his eye over the Bill he found that there were alterations in various other directions, and that various suggestions which the Medical Council made to the Government had not been adopted by Lord Balfour. For example, one of the clauses in the Bill that they gave some attention to was what was to be done with existing midwives? The proposition in the original Bill was that they were to go on the register if they could produce certificates of having been in *bonâ fide* practice. They felt that this was too sweeping, and would be loading the register with persons who had no right to be there. They had had experience of this. They had had a dentists' register allowing anyone who claimed to be a dentist to be put on the register without having had an examination or certificate of any kind. The register was therefore full of persons whose only claim to be on it was that on some occasion or other they had drawn a tooth. They would have the midwifery register loaded with women of that kind,—not only those who could show certificates, but anyone who could say that she had been in *bonâ fide* practice. The Council suggested that she should produce certificates from persons of position in the district also that she was a woman of good character. That had not been adopted, and so these safeguards had entirely been ignored. He thought that was a direction in which action should also be taken. The Midwives' Board, according to the constitution proposed in the original Bill, was limited to twelve persons: three from the Royal College of Surgeons of England, three from the Royal College of Physicians of London, three from the Society of Apothecaries, and three from the Incorporated Midwives' Institute. In the Bill as amended on Report it was proposed to add three other persons appointed by the Lord President in Council, of whom one should be a woman, and therefore the Midwives' Board should consist of fifteen persons. They were all anxious to ascertain what this Incorporated Midwives' Institute was. Dr Tuke would bear him out that not a single member of Council knew anything of the Incorporated Midwives' Institute. Since he came home he had received papers from the Institute. It consisted of a body of philanthropic ladies who had applied, not to the Privy Council, for a charter, but, he thought, to the Board of Trade. In accordance with a

recent Act of Parliament, which allowed the Board of Trade to give incorporation to associations of this kind, they had got a certain legal status. They were excellent ladies, he had no doubt, but what claim they had to return members to a Board in association with representatives of the leading bodies representing the medical profession in England and Wales, he, for his part, could not give them any information. But he observed, from the amended Bill, that the Lord President of the Council was now in addition to appoint three persons, of whom one at least should be a woman. These would also be persons, he supposed, of philanthropic disposition similar to the members of the Midwives' Institute. They would have a Board of fifteen persons, six of whom did not belong to the medical profession, but represented philanthropic and public interests, and did not represent in any way the feeling or tone of the medical profession. This was not to apply to Scotland, and from observations which had been made by several gentlemen who had spoken, it seemed as if the midwife in Scotland was rather an accident. She did not seem to be required, but undoubtedly she was required in England. There was no doubt that a Midwives' Bill, if a properly constructed Bill, would meet a great public want. He had no hesitation in saying that. They had before the Medical Council representatives from the counties of Lancashire and Cheshire, who made excellent speeches. One of the speeches made against the Bill was, in his judgment, the strongest argument in favour of it. It showed them that there was in England a great amount of malpractice on the part of uneducated women acting as midwives. The public in England would have midwives; they could not do without them. If so, then surely these women should be educated—educated women able to attend members of their own sex in times of trouble and difficulty. He felt this most strongly. It was their duty to see that these women were properly educated. He felt that he must support any properly-considered measure for the education of midwives. That education could only be tested by examination. One of the great blots on this Bill was that there was no provision for education. There was provision for examination. He did not think the word education once occurred in the Bill. The Medical Council suggested that there ought to be words inserted into the Bill, showing that these women had had proper training. Such words did not appear, and that he considered to be a great defect in this Bill as amended on Report. They had not taken the Council's advice on that matter; but still the practical point had to be faced by those women, that they could not pass an examination unless they were educated. In England he did not know how far there was provision for educating women. It was said they did not have it in Scotland. They were not pressed to have a Bill of this kind, therefore they were not directly affected by it. The Medical Council was to exercise a certain control over the Midwives' Board

as regards arrangements for examination. From what he knew of the Medical Council and its action in connexion with examinations in Medicine, in Public Health, and in Dentistry, the Medical Council would see that these rules were of the proper standard. He thought Dr Tuke would entirely bear him out that the Medical Council did not support any examination which was not of a *bonâ fide* character and calculated to test the knowledge of the individual. The Council would do its duty in that respect, and would require that all the rules for examination would be of a thoroughly *bonâ fide* kind. It almost seemed to him, in listening to the remarks, that those who spoke against this question did not sufficiently apprehend that examination must precede registration. Therefore before that the midwife—*i.e.* the woman under the new conditions—could be registered, she would have to show that she had had proper training and education. The Medical Council would insist on that, and they might say that all registered midwives would possess, up to a certain point, a knowledge of midwifery. But the difficulty that he experienced in regard to this Bill as amended on Report was that it was not a knowledge of midwifery as applied to natural labour, but a knowledge of midwifery generally. He did not know that he had anything else to say. He was afraid he had spoken too long, though there were other objections of a minor kind that one might offer to certain of the clauses in that amended Bill.

Dr Batty Tuke said that Sir Wm. Turner had fully expressed, he thought, everything that he (Dr Tuke) could possibly have wished to say on this subject in his usual statesmanlike manner. He might say, however, that during last winter this subject had been to him a source of great worry and hesitation, because it presented so many sides that it was impossible to say which side was the best. But he went up to London to the Council feeling that so far as home interests were concerned there was not much call to decide, because he believed that in Scotland the registration of midwives was not required. His experience of country practice in Scotland was not exactly, as certain gentlemen had said, that there were no midwives; but he knew a considerable number of country practitioners who maintained midwives, supervising them. But when he went up to London he found the Council discussing a Bill for the registration of midwives, a Bill which was strongly opposed by Sir Walter Foster and Mr Wheelhouse, who in a previous session of the Council had impressed on the Council the necessity of registration, and who had proposed and seconded a resolution which committed the Council to approving of such a measure. These gentlemen tried to ride on the term "midwifery-nurse," which was the most evident endeavour to get round the position they had taken. The Council had not been asked to consider the "midwifery-nurse," a word which the ordinary legislator could only interpret as a "monthly nurse," so that he

(Dr Tuke) had returned even more "mixed" as to the position than when he went up. He felt with Sir William Turner that the absence of a definition in the Bill as amended on Report was a serious matter. He had not seen the amended Bill, but if no restraining clause had been introduced, it would constitute the midwife a full practitioner in midwifery, which should certainly be strenuously opposed. The original definition was not a scientific one, but for all practical purposes it was sufficient, as it indicated a considerable class of women who by education and experience were competent to attend normal cases. Such women had existed since the world began, and would continue to exist. They relieved the work of the general practitioner; and it must be remembered that, were it possible to throw all midwifery work into his hands, a recrudescence of the unqualified male assistant must necessarily follow. But really one was unable to discuss the Bill as amended on Report. The whole aspect of the matter had changed, and in the absence of anything like definition, the registration should be resisted as far as it possibly could.

Dr Norman Walker said he had to thank them for the opportunity of being there to-day. He had, as many of them knew, taken an interest in the question for a good many years now. It was quite impossible for him to go over the whole ground, but on some of the points he would like to make a remark or two. Dr Hart said that there were some 800,000 cases of delivery every year in England, 500,000 of which were attended by midwives; but they knew that near the beginning of the century nearly all the cases were attended by midwives. Did it mean that the doctors were gaining on the midwives, or were they going back again? If the midwives were gaining on the doctors, were they not going back to the old system, or to one where poor women would be attended by midwives and the richer by doctors? Was it to be supposed that the new woman, if she had babies, would call in the midwife? It was said the poor could not afford to have both a doctor and a midwifery nurse. He could not remember, from his experience of practice in the north of England, that the nurses were required. The poor were very kind to one another: the difficulty was the number of friends willing to give assistance. It was an agricultural district. He had also had a pretty wide acquaintance in Sheffield and Derbyshire, and he had only met with one gentleman in favour of registration. Newcastle had solved the matter for itself in a way which he understood Dr Buist was trying to do, viz., by establishing a dispensary to which medical men were attached, and having a staff of midwifery nurses. The question of foreign practice had been referred to, and when he was abroad some years ago he took pains to inquire into the practice in Germany and Austria. A friend of his in practice in Baden-Baden gave him his experience. When he was called one day to a case he found that the midwife

in charge had injected into the patient's vagina pure carbolic acid in mistake for a weaker solution. It was his duty by the law to call attention to that, which he did. He had no more midwifery practice in that district. Another friend in practice in Hamburg gave him his experience. He had a large midwifery practice. After two years other two men came to practise in the place. His midwifery practice had disappeared altogether in a month, owing, he found, to the midwives getting a percentage of the fee paid to the medical man. That struck the Committee of the Branch as rather unusual. Only last Sunday he was told that exactly the same thing happened in the north of England. He had inquired how many practitioners in Scotland were put on the Medical Register who were not qualified, *i.e.* had no qualification at all, and was told about five. The number proposed to be put on by this Bill was 500 or 1000. They all saw the difficulties, but he could not agree with Dr Buist that all the English objections to the Bill were frivolous. His (Dr Walker's) opposition was perfectly honest, and he allowed the same to the other side. He thought it a pity that men should be accused of wilfully making objections for the purpose of destroying the Bill. He might point out to Dr Buist that the women who attended two of the cases quoted —one of placenta prævia and the other of albuminuria treated with opium pills—were both trained midwives, three months trained. Registration, which was supposed to be the panacea, would only consist in putting on the register these very women which they said were so incompetent. As to Sir William Turner's view, that they should leave everything to the General Medical Council, he did not think that they should give even the General Medical Council a blank cheque. The Council was not to draw up the rules, but others were to do so, and the General Medical Council were to accept or reject them. This would go on until finally a compromise would be arrived at which none of them could accept. He thought something on Dr Hart's lines would have to be adopted. In any Bill that might be brought forward, they should, first of all, see that a thorough system of education was demanded; secondly, that midwives should act entirely under the supervision of medical men.

Dr Thatcher said that, as a teacher of nurses for nearly twenty years, he would like to say a few words on the subject. He considered that he was supported in his opinion by a great number of country practitioners, that midwives were absolutely essential in Scotland. In large colliery districts and large manufacturing districts the practitioner had not time to do the work, and it was very important that women expecting to have children should be properly attended to. He thought that properly qualified nurses in these rural manufacturing districts were a great protection to the wives of the working classes. If the doctor had not time, were the women to be left alone, or to the mercy of women who had had

no training whatever? He thought a clear distinction should be drawn between the trained and untrained as regards capability. A three months' course, he certainly thought, was rather short. A longer course would be very much to the advantage of the nurses. Women, as far as his own classes were concerned, before they left, were examined partly on the theory and partly on their practical work. The examinations were not, he considered, trifling; they embraced a considerable amount of work. Before they gave a certificate they expected her to have fully what would be a pass mark for a medical student on the subject of midwifery; and as regards registration, he thought in some respects it might do good by putting a restriction on women who were inclined to do too much; but he thought it would be a pity that so many unqualified women should be cast upon the public. He had had considerable experience in being sent for by nurses connected with their Institution, women also who had been trained there, and he was bound to say he had never seen anything happen that might not have happened with any one. They had sent in proper time, and had not been guilty of neglect.

Dr James Carmichael said that he might have misunderstood Dr Thatcher; but if he really meant to say that a midwife who had had three months' training was expected to be as well informed as a medical student who had received a full training in anatomy and physiology and all the other subjects of a medical education, to his mind it was quite ridiculous.

Dr Thatcher explained that he expected the nurse to come up to the same standard in proportion to her training as the medical student did in proportion to his.

The President said that he thought it was time the discussion was brought to a close and they passed to another item on the programme. He thought it was a wise thing to hold this discussion. He wished to thank their guests—Sir William Turner, Dr Tuke, and Dr Norman Walker—for their contributions to the debate, and especially Sir William Turner for his remarks that this Bill was very different from what was brought forward before, that they must practically study the question *ab initio*, that no definition had been given of the term midwife, that many valuable suggestions of the General Medical Council had not been adopted, and especially for the light that had been thrown on the composition of the Midwives' Board, of which six out of fifteen members were to be people with no special experience or interest in medical education. That these people should be put on the same Board on a level with members of the College of Surgeons and Physicians was, to his mind, quite absurd. If he understood Dr Hart, he was in favour of the registration of midwifery-nurses, while he would leave midwives to die a natural death. He felt inclined to support Dr Hart, were it not for the difficulties brought up with regard to the term nurse, and also

that in country districts, when patients called in a doctor they did not require a nurse in addition. He saw the practical difficulties in the way of the substitution of nurses for midwives. He thought the practical conclusion of this debate was that in Scotland at present there was no great need for the registration of midwives. They had, unfortunately, not had a large representation of country members. But those who had spoken were representative Fellows of the Society, and their testimony had been unanimous. Nothing had struck him more than what Dr Connel said as to the midwives dying out and medical practitioners taking up their work. Dr Macvie had said that he had never heard of a midwife in Berwickshire. If that at all represented the state of affairs in that county, and there was a large section of the country in this condition, there was not the same call for action on this matter in Scotland as in England. At the same time, England and Scotland were in many respects one country, and their interests as regards medicine were the same. One result of the discussion would be, he hoped, that they would all watch this Bill very closely. It might become an Act for England, and if anything was passed for England it would sooner or later cross the Border. They must watch the Bill along these three lines,—1. What was the definition of midwife? 2. What provision was to be made for education? and 3. What was to be the composition of the Board which was to settle the important question with regard to registration? He desired in the name of the Society to thank those of their guests who had been with them that evening and had taken part in the discussion.

Dr Ritchie said that the Parliamentary Committee of the British Medical Association had remitted it to a sub-Committee to prepare a scheme of this kind; that they had done so; and that it had been agreed to send down this scheme, along with Lord Balfour's Bill, to the Branches for their opinion. He could not agree that Scotland should remain neutral.

After the discussion, the Fellows dined together, covers being set for over ninety. The toast of "The Guest of the Evening" (Prof. Simpson) was proposed by Dr James Ritchie, and suitably responded to. Thereafter other toasts, songs, and stories were the means of pleasantly terminating a most successful meeting.

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